OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME 44, NO. 20
SEPTEMBER 26, 1955

AMERICAN DYESTUFF REPORTER

Devoted to Textile Chemistry
BLEACHING · DYEING · PRINTING · FINISHING

Standing behind

your Du Pont salesman

The salesman from Du Pont doesn't work alone. There's a whole staff of experts behind him ready to be at his service—and *yours*—at any time. Your salesman, a trained technician himself, is only one part of Du Pont's *unmatched* technical-service group.

Directly behind the SALESMAN—who is always glad to give you on-the-spot assistance—are the Du Pont DEMONSTRATORS, a group of all-around textile men. Each demonstrator is a highly trained technician with particularly broad experience in the dyeing and finishing field. He'll help you on any problem you might have, simple or complex, by working with you in your plant.

In addition, every DEMONSTRATOR has at his disposal the facilities of the DISTRICT SERVICE LABORATORY, backed up by Du Pont's main CUSTOMER SERVICE LABORATORY.

At the end of this chain of experts, in the Du Pont RESEARCH LABORATORY, skilled chemists are constantly working toward new and improved dyes, processes and methods—all to bring you better dyeing and finishing.

The next time you talk to your Du Pont salesman, remember the well-trained staff behind him. They're all—*at your service*. Contact: E. I. du Pont de Nemours & Co. (Inc.), Dyes and Chemicals Division, Wilmington 98, Del.

Du Pont Dyes

DU PONT

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DISTRICT OFFICES

Atlanta, Georgia	1261 Spring Street, N. W.
Charlotte, N. C.	427 West 4th Street
Chicago, Illinois	7 South Dearborn Street
Los Angeles, California	2930 E. 44th Street
Rumford, R. I.	50 North Broadway
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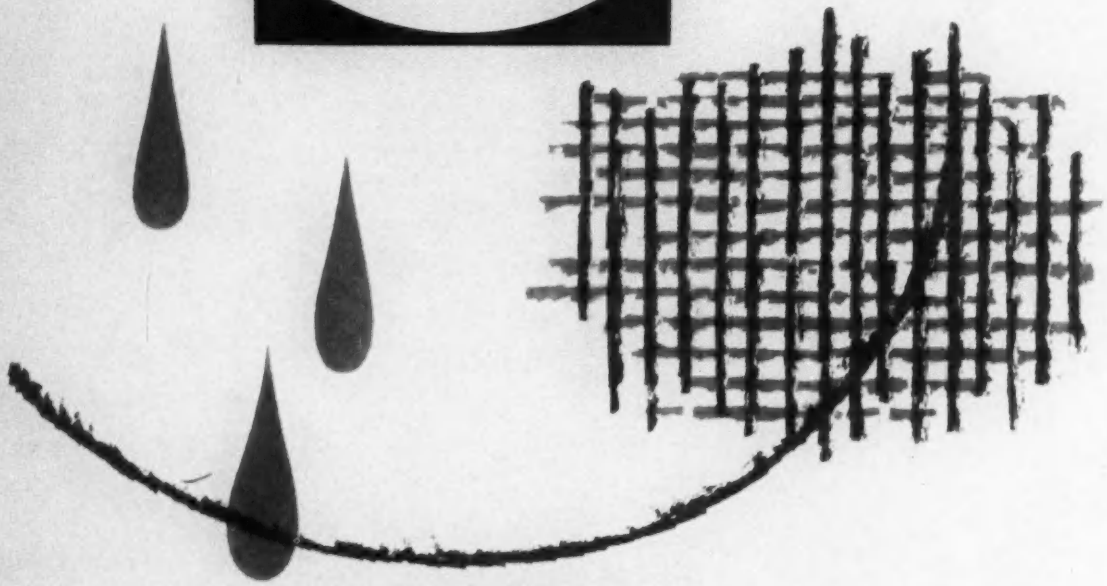
Philadelphia, Penna.	1616 Walnut Street

spotlight on

oxidation stability

in oleic acid



how Emersol Elaine eliminated uneven dyeing fault of a fiber lubricant

If you have a problem involving a "breakdown" or "change" in your products induced by aging or oxidation, then this customer experience will be of interest: *Case History No. 27-31 . . . The difficulties of uneven dyeing of yarns and fabrics in a textile mill precipitated a thorough investigation of all variables. The trouble was traced to this manufacturer's fiber lubricant which oxidized on the yarns. This led to only partial "oil" removal in scouring, which left sufficient residue to prevent uniform penetration of the dye.*

Since oleic acid was a constituent in this manufacturer's lubricant, a study of oxidation stabilities of double-distilled oleic acids from different producers was undertaken. Laboratory results showed that Emersol 221 White Elaine exhibited superior oxidation stability, and when substituted in his regular production, eliminated all previous dyeing difficulties.

This experience serves only as an example of the benefits derived from the outstanding oxidation stability of Emersol Oleic Acids. When this is added to their excellent color stability and resistance to rancidity, you get an unmatched combination that will make your products better, more appealing, and stay that way longer . . . and all at no extra cost. So, if you are not already benefiting from the Emersol Elaines, buy your next, and all oleic acid requirements from Emery.

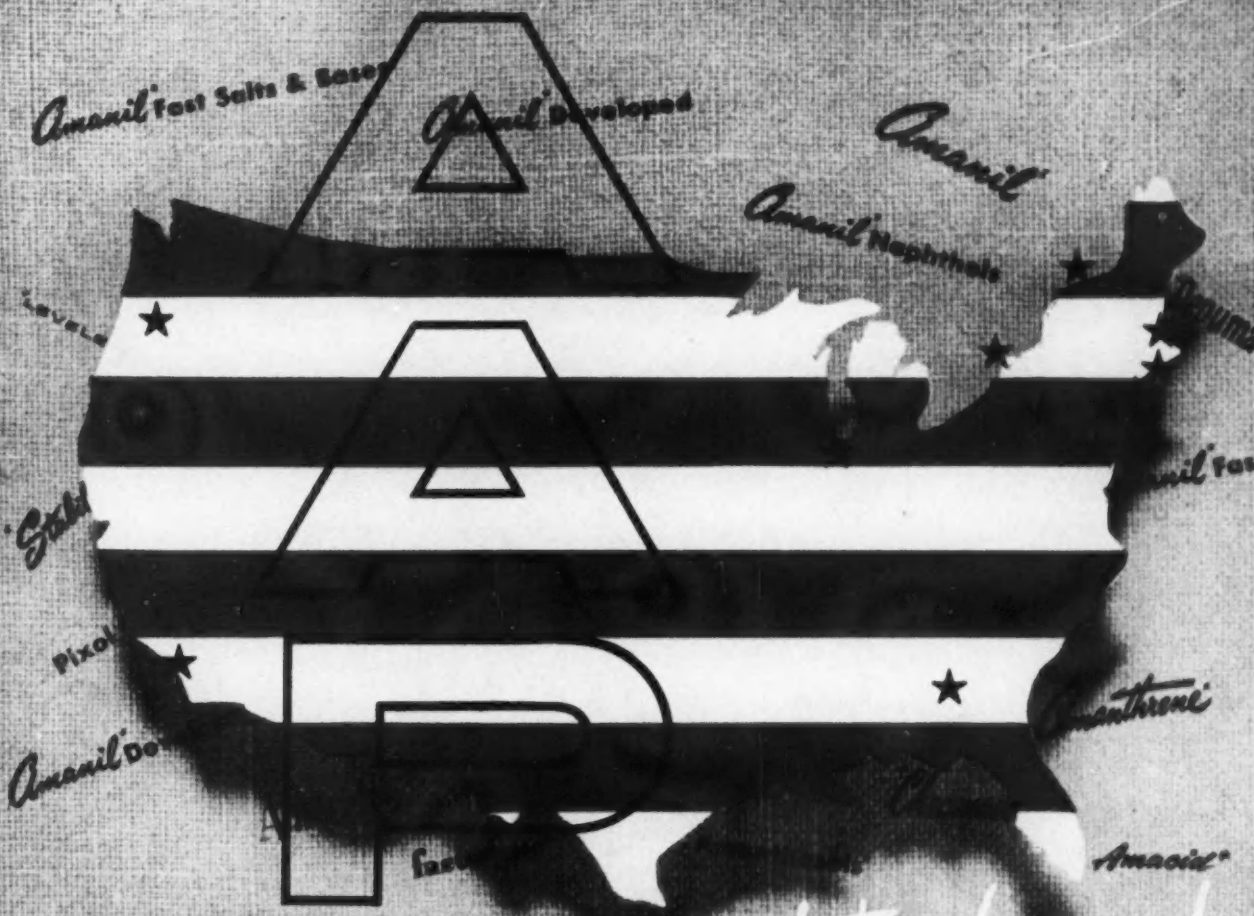
Write Dept. A-9 for 20 page brochure titled "Emersol Oleic Acids."

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

New York; Philadelphia; Lowell, Mass.; Chicago; San Francisco; Cleveland; Ecclestone Chemical Co., Detroit
Warehouse stocks also in St. Louis, Buffalo, Baltimore, and Los Angeles
Export: Carew Tower, Cincinnati 2, Ohio



pattern for service at the point-of-need

To serve its customers with maximum efficiency, A.A.P. maintains many strategically placed Branch Sales Offices, in addition to its home office in New York City and its 35-acre manufacturing works at Lock Haven, Pennsylvania.

Like the main office in New York City, each branch has its own warehousing facilities and complete application laboratories; thus, dyers, finishers, and printers in all textile centers are assured of convenient sources of supply, as well as prompt and expert assistance whenever special color problems arise.

Behind A.A.P.'s extensive facilities lie almost four decades of constant research and rigid manufacturing control. The benefits of this accumulated experience are yours for the asking. Technicians from our nearest branch will be happy to provide you, at any time, with full information on A.A.P. products and service.

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York 3, N. Y.
Plant Lock Haven, Pa.

Branches: Boston, Mass.
Providence, R. I. • Philadelphia, Pa.
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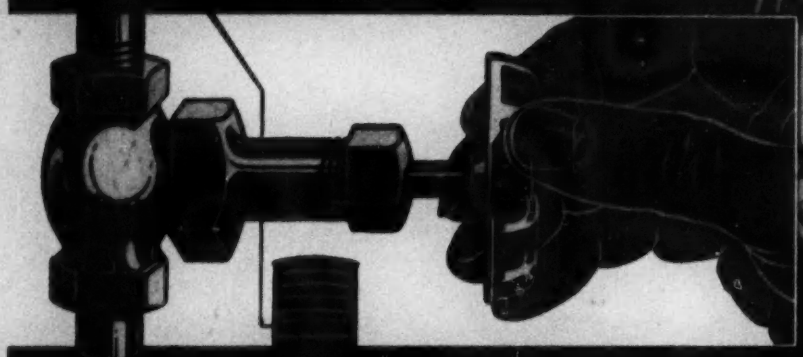
Dominion Anilines & Chemicals, Ltd.
Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

—TEXTILE FINISHERS:



CATALIN

UREA FORMALDEHYDE

LIQUID Resin 8171

ELIMINATES NEEDLESS OPERATIONS

The multiple manpower operations required to handle, measure and mix paste-form crease resistant finishes are money-consuming and time-wasteful! Furthermore, no batches thus made can compare in uniformity and accuracy with a *used-as-received* liquid formulation.

By turning from pastes to Catalin Resin 8171 (a versatile, water-soluble, monomeric LIQUID urea formaldehyde formulation) . . . many large textile finishing plants are now enjoying important production economies, better and more uniform finishes . . . and the sense of satisfaction that comes with saving both time and money!

Catalin Resin 8171 is available only in tank car and tank truck quantities. It readily meets TBL crease-resistance specifications as applied to spun rayon fabrics and blends.

Catalin field representatives, experienced in the processing problems of the textile industry, welcome the opportunity to submit samples and discuss the cost-cutting and quality advantages of Resin 8171. Inquiries invited.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE, NEW YORK, N. Y.

BRANCH OFFICES: CHICAGO, ILL., 221 No. LaSalle Street
GREENSBORO, N.C., 630 Southeastern Bldg.

Catalin

PLANTS at FORDS, N. J.
CALUMET CITY, ILL.
THOMASVILLE, N.C.

American Dyestuff Reporter, Vol. 44, No. 20, Sept. 26, 1955. Published every other Monday. Copyright 1955, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Domestic subscription, $7.50; Canadian, $8.50; Foreign, $15.00. Effective Dec 1, 1954. Entered as second-class matter Nov. 6, 1919, at the New York, N. Y., Post Office under the act of March 3, 1879.

for colors *truly fast*—by *your* standards—

INDANTHRENE® VAT DYES

Whatever the use for the fabrics you dye or print—for clothing, upholstery, draperies, floor coverings, awnings, etc.—the unavoidable demand is that they shall be fast-to-light, fast-to-washing. Your customer's business is safeguarded, when you use vat colors... Indanthrene Vat Dyes have been the standard of the industry for more than 50 years.

From a single source, you draw on the widest color range available. Moreover, to be certain of meeting any requirement you establish, these colors are standardized in as many as six different physical forms...

- "WP" brands—dispersible powders for pigment padding and package dyeing
- "A Pdr." brands—full strength undispersible powders
- "Suprafix Paste" brands—non-drying, non-freezing, fast-fixing pastes for printing
- "Ex. Paste Fine" brands—non-drying, non-freezing pastes for printing
- "Paste" and "Dble. Paste" brands—dispersed pastes for dyeing

and now— • "Intra Paste" brands—finer milled to afford instant and complete dispersion—speck-free in lighter shades—new, trouble-free ease of working

Consider the strategic location of our warehouses and laboratories to meet your immediate needs. Call upon our Technical Service Department for assistance in any color or color-matching problem. We invite your inquiry.

From Research to Reality

gdc

GENERAL DYESTUFF COMPANY

A SALES DIVISION OF GENERAL ANILINE & FILM CORPORATION

435 HUDSON STREET • NEW YORK 14, NEW YORK

BOSTON • CHARLOTTE • CHATTANOOGA • CHICAGO • LOS ANGELES • NEW YORK • PHILADELPHIA • PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO

Announcing a new testing program for fabrics finished with "ZESET"

Only fabrics tested and approved by Better Fabrics Testing Bureau will be awarded this new "ZESET" tag

To maintain the position of Du Pont "ZESET" fabric stabilizer as an outstanding crease-resistant finish, a new Quality-Testing Program has been set up. This new program is designed for one thing, and one thing only—to assure finishers, converters, cutters, retailers and consumers the full benefits of Du Pont "ZESET."

FABRICS TO BE TESTED

Here's how this Quality-Testing Program will work. Samples of cotton and rayon fabrics treated with Du Pont "ZESET" fabric stabilizer will be submitted to the Better Fabrics Bureau for approval. Fabric samples will be tested for (A) crease resistance, (B) shrinkage control, (C) tensile or tear strength, (D) color-fastness to washing.

NEW TAG A BADGE OF QUALITY

Only those fabrics which meet the high standards of these tests will be allowed to wear the mark-of-quality "ZESET" tag.

This new "ZESET" tag will give everyone complete assurance that the fabric possesses all the advantages of "ZESET," including *better* wrinkle resistance, a *choice* of soft or crisp hand, a *facility* for accurate cutting.

WRITE FOR FURTHER INFORMATION

For more detailed information on this important new program, just write E. I. du Pont de Nemours & Co. (Inc.), Dyes and Chemicals Division, Wilmington 98, Delaware, or your nearest Dyes and Chemicals District Office.

DU PONT

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

DU PONT **ZESET** FABRIC STABILIZER

REG. U. S. PAT. OFF.

For fabrics that shake off wrinkles

DUROFAST BROWNS

BRL
3RLL
5RLL

Lasso your most elusive shades easily with **DUROFAST,** and you can be sure they will stay put.

DUROFAST colors offer exceptional fastness to light and washing and are suitable for resin after-treatments

Write now for color cards, samples and technical data.

B

COLOR & CHEMICAL CO.

Manufacturing and Executive Offices

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210 Albany Street, SPRINGFIELD 5, Mass.

Stocks maintained at: CHARLOTTE • GREENVILLE CHARLESTON and LOS ANGELES

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The Standard of Color Perfection

SINCE

1876

Camel

TEXTILE

Dyes

Three-quarters of a century has built the name of Camel into a symbol of dependability for textile dyestuffs—75 years of uninterrupted service to the industry as a background of experience for prompt, efficient attention to all textile dyestuff requirements and problems.

Refer your dye problems to our laboratories . . . capable, experienced engineers are ready to serve you.

John Campbell and Company

75 HUDSON ST., NEW YORK CITY—BArclay 7-6228

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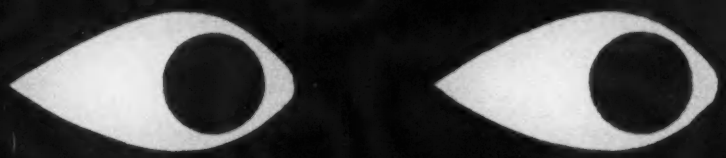
BRANCH OFFICES & WAREHOUSES: BOSTON • EAST CLEVELAND, OHIO • ATLANTA, GA.

AMERICA'S LEADING SYNTHETIC DETERGENT



Send for Sample

and See for yourself

Why

Nacconol SL

IS THE LARGEST SELLING LIQUID DETERGENT IN THE TEXTILE INDUSTRY

Many mills are now cutting wet processing costs with Nacconol SL because

on an equivalent active ingredient basis Nacconol SL is a better money value than most dry products. Your detergent materials cost is less because you get more cleaning power per dollar.

and

You save on handling costs, too. Nacconol SL, being a liquid concentrate, is easy and clean to handle, requires no dissolving. You simply add water to secure the desired working concentration.

For complete technical data, send for Bulletin 326.

* Alkyl Aryl Sulfonate

Nacconol

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N.Y. • HAnover 2-7300

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Chicago 54, Ill., The Merchandise Mart Dearborn 7-3007 | New Orleans 12, La., Canadian Bldg. Raymond 7258

Toronto 2, Can., 107-165 Wellington St. W. Empire 4-6693

*A **cure**, not a treatment, for Pollution Problems...*

This is the first in a series of advertisements based on a technical paper by B. W. Dickerson, Sanitary Engineer, Hercules Powder Company. A complete copy of the report or additional technical data on CMC Warp Size can be obtained by writing directly to Hercules.

If finishing mill wastes cannot be dumped into nearby waters in their present form and the cost of treatment is prohibitive, what is the answer? Many waste engineers have found that going to the source of the trouble can correct the situation and eliminate the need for a large capital expenditure for sewage plant facilities.

In a typical finishing plant, a percentage breakdown of the BOD (Biochemical Oxygen Demand) shows that the desizing operation is the obvious "villain". Up to 60 per cent of BOD pollution is a result of desizing, with dyeing and finishing contributing 30 to 40 per cent and bleaching about 10 per cent.

Years of preliminary study, followed by actual use on a production scale, have demonstrated that the introduction of proper amounts of CMC Warp Size in the sizing formulation can cut desizing pollution by as much as 75 to 85 per cent. Such a reduction of pollution would permit many mills to conform to abatement regulations without the need for construction and operation of a waste treatment plant. For mills with more severe pollution problems, the use of CMC Warp Size can reduce the cost and operating expense of treatment units as much as 50 per cent.

Formulations composed of two parts starch and one part CMC Warp Size provide adequate sizing at 6 to 8 per cent add-ons. In many instances, this much lower add-on will reduce the amount of water required in desizing by as much as 50 per cent. The presence of water soluble CMC Warp Size in the formulation can eliminate the need for the use of enzymes, greatly speeding and simplifying the desizing process.

VC55-5

Virginia Cellulose Department

HERCULES POWDER COMPANY

INCORPORATED

993 Market St., Wilmington 99, Delaware

SUNTONE®
Pigments

FOR QUALITY · THAT DOES · YOUR JOB BEST

Warwick's Chemical unique experience in the formulation of textile printing colors is supported and enhanced by Sun Chemical Corporation's far reaching activities in the manufacture and development of paints and printing inks. The result is textile pigments of extreme color and brilliancy. Warwick maintains laboratory and service facilities at Rock Hill, S. C., Harrison, N. J., and Wood River Junction, R. I. Write the office nearest you for free, fast, expert service.

Warwick Chemical Division
10th Street and 44th Avenue • Long Island City 1, N. Y.

DIVISION OF SUN CHEMICAL CORPORATION

MONSANTO'S MELAMINE RESINS DON'T WASH OR DRY CLEAN OUT OF FABRICS

When cottons and wools, pure synthetics and blends are treated with Resloom, two things are certain:

1. They will be upgraded in hand and appearance.

2. They will retain their fresh-and-new look through countless washings or dry cleanings.

Monsanto has formulated Resloom HP and M-75 from melamine, the resin that's hardest and most durable of them all. Their resistance to water, alkalies and solvents is remarkable.

Resloom resins do not coat the fabric. Instead, they are deposited inside absorbent fibers. The resins actually modify the characteristics of the fibers.

Though extra hard, Resloom resins do not create a harsh hand when the fabric is properly impregnated. And they are in a class by themselves for surface lustering or glazing.

Treatment with Resloom develops excellent crush resistance, dependable shrinkage control and novel textures. A Monsanto representative will be glad to work with you on technical problems relating to special finishes. Write Monsanto Chemical Company, Plastics Div., Dept. AD-9, Springfield 2, Mass.

It pays to finish fabrics with durable

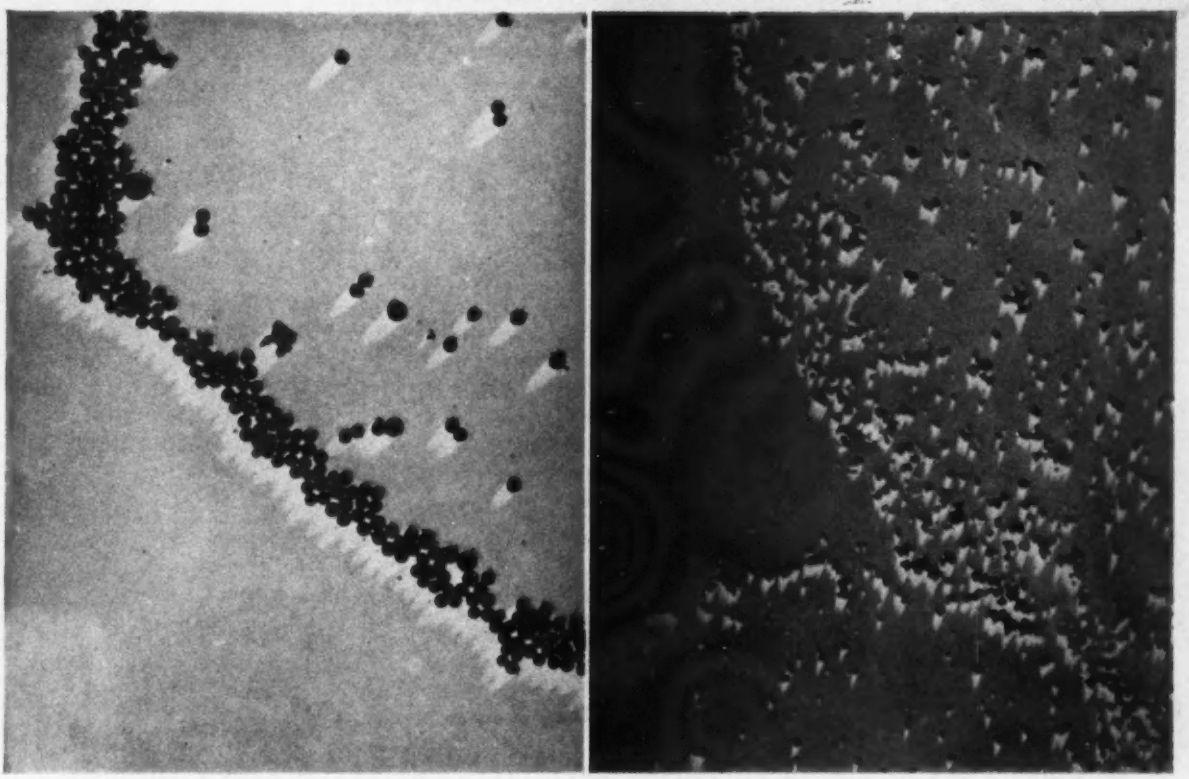
RESLOOM *MELAMINE RESINS*

*RESLOOM: REG. U. S. PAT. OFF.

MONSANTO

Serving industry . . . which serves mankind

ELECTRON PHOTOMICROGRAPHS (10,000X) compare normal size latex particles (left) approximately 0.25 micron (2500Å) in diameter, with those of new, small-particle size CHEMIGUM LATEX, approximately 0.05 micron (500Å) in diameter.



Here's what you'll gain

with new, small particle size CHEMIGUM LATEX

IF you're now using latex in sizes, saturants, finishes, dye vehicles or adhesives, here are the advantages of changing to new, small-particle size CHEMIGUM LATEX: Better binding action. Improved wetting and penetration. Easier handling. Greater resistance to discoloration. Lower costs.

If you are not using latex in any of the many possible ways, here are some of the product improvements you can effect with new CHEMIGUM LATEX: Better feel and drape. Greater body. Higher strength and dimensional stability. Increased resistance to washing, wearing, wrinkling, raveling, tearing, snagging and sliding.

The new CHEMIGUM LATEX is a nitrile rubber dispersion exhibiting the following properties: Medium or high acrylonitrile content. A particle-size about one-fifth that of regular latex—about 20% smaller than other small-particle latices. Low specific gravity. Very high mechanical stability. Low viscosity and surface tension. Ready precipitation by ions.

Details on how the new, small particle-size CHEMIGUM LATEX can help your product are yours by writing:
Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliaflex, Pliolite, Plio-Tuf, Pliovic —T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

The Finest Chemicals for Industry — CHEMIGUM • PLIOBOND • PLIOFLEX • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS

I'm Paul Logue. I head up a department of specialists here at WICA in Charlotte to set you up with WICA resins.

thermo-

Now we're manufacturing our own thermo-setting and thermo-plastic resins—right here in the South. We're turning out a dynamic series of resins varying from one extreme to the other in hand, durability and thermal behavior.

setting

We're proud of what's coming out of this plant, and you will be, too. We are meeting head-on the changing trends in new fibers, creating the tools that will help you chalk up new developments in a tight industry.

resins

Don't have to tell you what our WICA resins will do to boost the value of your tags. Customer faith in those tags is like money in the bank. Wica Chemicals, Inc., Old Concord Road, Charlotte, N. C.

by WICA

our newest arrival

Synthrapol® KB

A new and different 97% active non-ionic surface-active agent for use in the wet processing of textile yarns and fabrics.

Combines —

- Exceptionally good detergency
- Excellent solubility
- Extremely fast wetting action
- Economy in operation

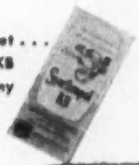
ARNOLD, HOFFMAN

PROVIDENCE, RHODE ISLAND
Associated with Imperial Chemical Industries Ltd., London, England

ARNOLD, HOFFMAN & CO., INCORPORATED • EST. 1815 • PROVIDENCE, R. I.
Offices and Technical Service Laboratories:
Providence, R. I. • Atlanta, Ga. • Charlotte, N. C. • Teterboro, N. J.

AHCO PRODUCTS

Send for this booklet . . . Describes Synthrapol KB in detail; suggests many textile applications.



Arnold, Hoffman & Co., Inc.
55 Canal St.
Providence 1, R. I.

Please send me a copy of your new Synthrapol KB Booklet

Name and Title _____

Firm Name _____

Address _____

City _____ *State* _____

Hycar Latex treatment for denim granted Good Housekeeping's guaranty seal

REPLACEMENT OR ★ REFUND OF MONEY
Guaranteed by Good Housekeeping
IF NOT AS ADVERTISED THEREIN

NO NEED TO WASH JEANS SEPARATELY!

THANKS to treatment with Hycar Latex—a new process discovery—you can wash these new denims in the same washer load with whites. What's more, they wear longer, they're softer, they keep their "new goods" feel and appearance much longer than ordinary denims.

Look for "Hycar-Sized" on the label when you buy. Write Dept. CQ-9, B. F. Goodrich Chemical Company, Cleveland 15, Ohio for names of manufacturers.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Manufacturers—Write the above address for full information on Hycar sizing.

THIS AND SIMILAR ADVERTISING IS NOW BEING PLACED IN GOOD HOUSEKEEPING MAGAZINE BY B. F. GOODRICH CHEMICAL COMPANY

now

a brand new line of colors

belle fast

*means ULTRA fast**

colors for cotton and viscose

Uniform quality colors
that will MAKE FRIENDS,
as well as sales,
for your products.

*when aftertreated with Bellefix CN or Bellefix VS

Write for complete information.
Our technical service is available at all times.

BELLE COLORS

Belle Chemical Company, Inc. / Reading, Pennsylvania / Charlotte, North Carolina

See what you can do with the new textiles

They're weaving magic into modern textiles. Today, fabrics can be made stronger or softer, cooler or warmer, tougher or lighter, shrinkproof, mothproof, fireproof, waterproof, and almost foolproof. While it would be difficult to predict what the textiles of tomorrow will be like, one thing is certain—chemicals will make an even greater contribution to their improvement.

Working closely with textile manufacturers and finishers, Olin Mathieson offers invaluable assistance through a long-range program of *coordinated planning and production*. This assures the availability of chemical raw materials regardless of changing market conditions; assures adequate chemical production to supply growing industrial capacity; speeds the development of new chemical products and processes; provides greater flexibility in shipping and handling of materials; provides the personal attention of recognized product experts backed by widely diversified research facilities.

Currently, a growing number of chemical consumers are coordinating their planning and production with Olin Mathieson . . . America's prime producer of basic industrial chemicals. Olin Mathieson's long experience and familiarity with the broad market picture will prove invaluable in your planning. Why not consult with us *now?*

MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION

INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

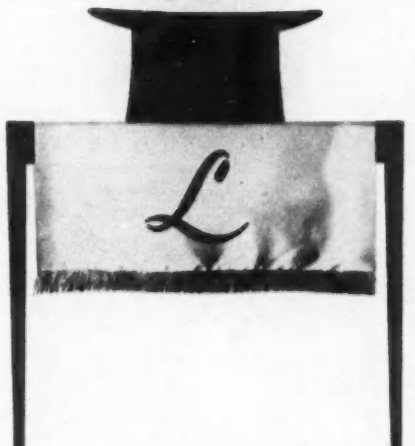
3300

MATHIESON

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid

ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichlorethylether Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Trichlorobenzene

The Magic is "LANOLIZED"



A wonderful new finish that makes nylon stockings superbly comfortable, exquisitely beautiful . . . nylons that *feel* better, *fit* better, *look* better, *wear* better! Examine LANOLIZED nylons critically. See how silky-smooth, soft, perfect-fitting they are . . . how cobwebby-sheer, smoky-full . . . how completely alluring!

Lanolized®

THE NEW MEMBER OF THE DuraBlend FAMILY — THE PROCESS THAT TREATS NYLON STOCKINGS WITH LANOLIN

SCHOLLER BROS., INC.

Authorized Manufacturers and Distributors of LANOLIZED® . . . The Miracle Finish. Collins & Westmoreland Sts., Philadelphia 34, Pa. IN CANADA: Scholler Bros., Ltd., St. Catharines, Ontario

PIONEERS IN TEXTILE FINISHES SINCE 1907

In TEXTILES *and Chemicals*
IT TAKES BOTH
FINE MATERIALS AND KNOW-HOW

SOLVAY's position as a leading supplier of chemicals to the textile industry is the result of having provided not only materials of the highest quality . . . but also skilled technical assistance in the use of these products. For in addition to textile chemicals that have set a standard for over 73 years, SOLVAY offers the facilities of the section of their Technical Service Department that specializes exclusively in textiles.

Over the years, the engineers and technicians of SOLVAY's Technical Service Textile Section have acquired a vast knowledge and experience. They have at their disposal extensive laboratory facilities and equipment devoted solely to textile processing and testing, in addition to the general organization and equipment of the world's largest alkali research laboratories. This combination of knowledge, experience and specialized laboratory equipment has made it possible for our Textile Section to supply assistance on both technical and production problems, at various times over the years, to most of America's leading textile producers.

SOLVAY makes no charge for services of this kind. It is simply one of the service dividends that go with the purchase of SOLVAY textile chemicals.

SOLVAY PROCESS DIVISION
Allied Chemical & Dye Corporation
61 Broadway, New York 6, N. Y.

Allied Chemical

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit
Houston • New Orleans • New York • Philadelphia • Pittsburgh
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SOLVAY

SODA ASH
CAUSTIC SODA
LIQUID CHLORINE
SODIUM NITRITE
POTASSIUM CARBONATE (Calcined and Hydrated)

fast colors

Azogen
printing
colors

ALLIANCE

BLACKMAN-UHLER CO.
ALLIANCE COLOR & CHEMICAL CO.
Divisions of the Azogen Company

Honeywell process control assures high efficiency *for new Coats & Clark thread plant*

At the new Toccoa, Ga. plant of Coats & Clark, Inc., modern textile finishing equipment is complemented by modern instrumentation. Honeywell supplied the automatic controls for the mercerizing range, dryer, and caustic recovery plant.

COATS & CLARK'S modern new thread finishing plant in Toccoa, Ga., boasts the latest type processing equipment and automatic control. Instrumentation for caustic recovery, mercerizing, and drying is by Honeywell.

Outstanding example of economy and efficiency is the mill's caustic recovery plant. Caustic consumption has been reduced 75%. In addition, by-product heat in the form of hot water is used in the boiler plant, mercerizer, and other mill equipment. To protect this expensive equipment, three *ElectroniK* Conductivity Controllers continuously check the water for caustic content.

Mercerizing range temperature is controlled at four different stages by sensitive *ElectroniK* Recording Controllers. Honeywell instruments also control caustic density at the two middle stages.

As the threads leave the Andrews & Goodrich dryer, *Moist-O-Graph* detectors accurately sense moisture control, and regulate the set points of *ElectroniK* Temperature Controllers on each section of the dryer accordingly.

Honeywell can supply complete control equipment for every plant application. One source for instruments centralizes engineering responsibility, simplifies maintenance, and keeps your spare parts stock at a minimum. Your nearby Honeywell sales engineer will gladly discuss applications in your plant. Give him a call . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● REFERENCE DATA: Composite Catalog No. 5002, contains brief description of the complete Honeywell product line.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

The ULTRAWETS wet, penetrate, clean, emulsify

Smart man to know for **CLEAN, BRIGHT** colors

Here's a man who knows his way around textiles, *Ultrawet 60-L*, a quality alkyl aryl sulfonate, highly skilled at delivering clean, bright colors through your soap-off bath.

Ultrawet 60-L works with economical efficiency. A synthetic detergent, it leaves no soap curd to dull bright colors—heavy metal precipitates cannot be deposited, and even their formation is reduced. Crocking is ended because *Ultrawet 60-L* removes loose dyestuffs with ease.

Like to try *Ultrawet 60-L* yourself? It's easy to use. You'll find it a constantly uniform liquid, with a haze point as low as 14°F. We'll be glad to send you full information on this versatile member of Atlantic's Ultrawet family. Send the coupon, or write one of the offices listed.

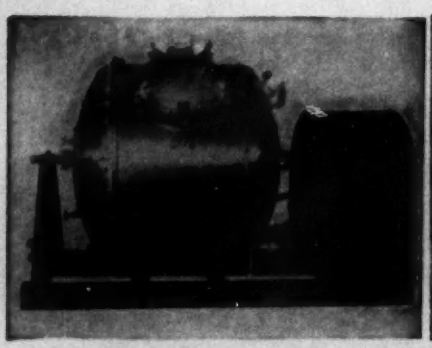
ATLANTIC PETROLEUM CHEMICALS

Philadelphia, Providence, Charlotte, Chicago
In the West: L. H. Butcher Co.
In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.
In Europe: Atlantic Chemicals SAB Antwerp, Belgium

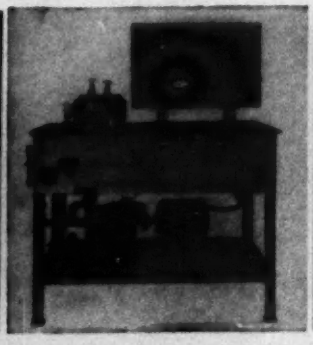
THE ATLANTIC REFINING COMPANY
Dept. F-9, Chemical Products Sales
260 South Broad Street, Philadelphia 1, Pa.

Please send me complete details on Ultrawet 60-L

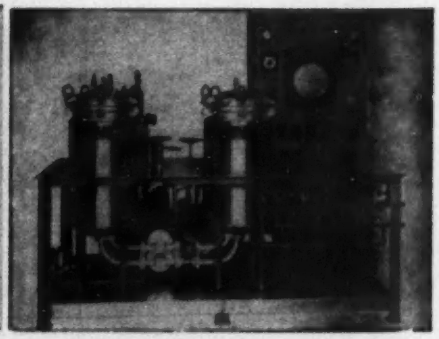
Name _____
Position _____
Company _____
Address _____



High Pressure Rotary Dyer



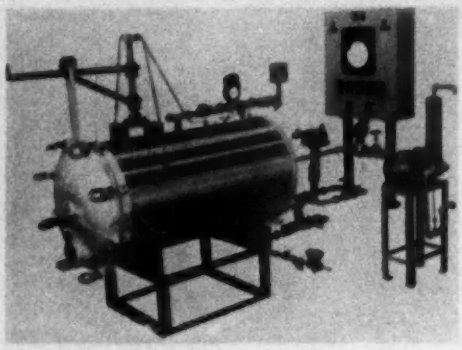
Laboratory Dyeing Machine



Two-Kier Package Dyeing Machine (table model)

GASTON COUNTY'S COMBINATION OF MONEY-SAVING FEATURES PUTS MORE **PROFIT** IN YOUR DYEING OPERATION

New "Hy-Vacuum" Pressure Autoclave for Twist Setting



For better, faster, more economical dyeing — Gaston County machines take top rating in any test. No other equipment offers the combination of advantages embodied in Gaston County's rugged construction, complete flexibility, and modern automatic controls. Whether your operation is large or small, simple or complex, Gaston County offers a complete range of standard equipment — or new models can be developed economically to meet your individual requirements. Write for illustrated literature, or call on us for engineering assistance.

GASTON COUNTY

Pioneers in Automatically

Gaston Co. Dyeing Machine Co.
Terminal Bldg., 68 Hudson Street
Hoboken, N. J., G. Lindner, Mgr.

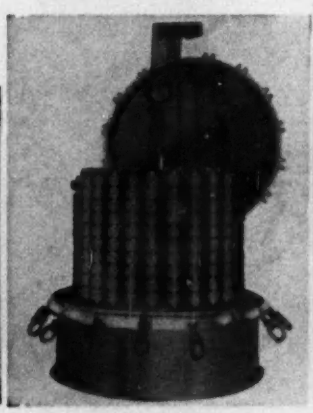
STANLEY, N. C.

DYEING MACHINE CO.

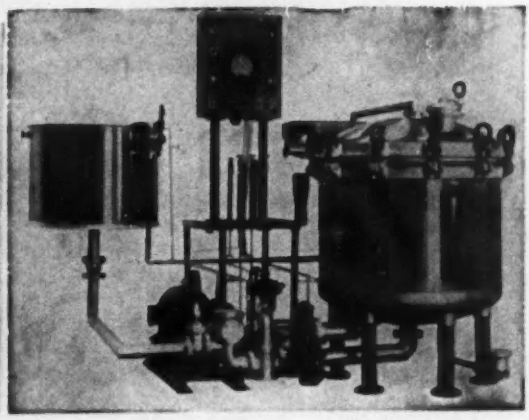
Controlled Dyeing Machines

The Rudel Machinery Co., Ltd.
614 St. James Street W., Montreal
137 Wellington Street W., Toronto

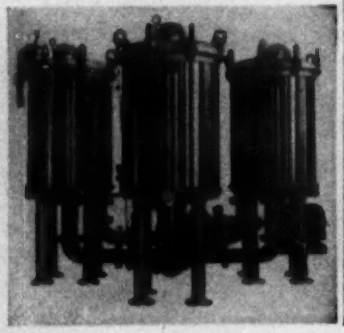
Combination Extractor-Dryer with Movable Package Carrier



Single-Kier Package Dyeing Machine



Multiple-Kier Beam and Package Dyeing Machine



DESIZING UNIFORMITY

TIME AFTER TIME WITH

RHOZYME LA*

RHOZYME LA is the most dependable desizing enzyme now available to the textile industry.

RHOZYME LA has consistent high quality, is stable in storage, and also exhibits unusual heat resistance in high-speed, high-temperature operations.

For the full story on this low cost, highly efficient agent, write for our technical bulletin.

* **RHOZYME LA** *is another dependable chemical product for the textile industry made by the makers of* LYKOPON.

RHOZYME and LYKOPON are trade-marks, Reg. U.S. Pat. Off. and in principal foreign countries.

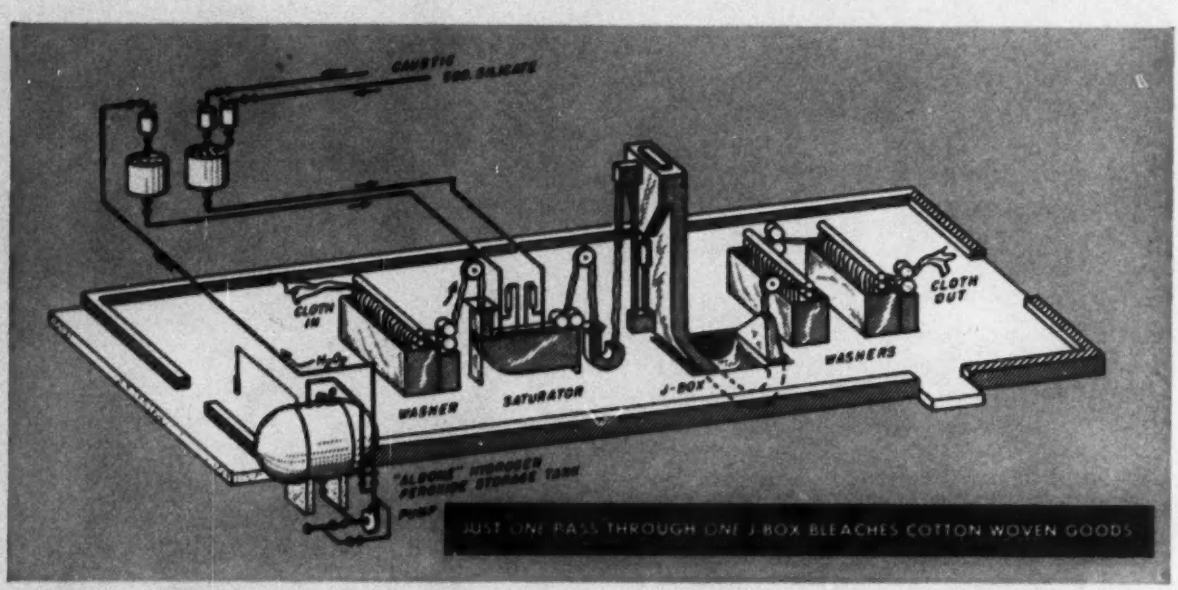
CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

Here's the latest Du Pont contribution to better peroxide bleaching for you



ONE-STEP single-stage continuous bleaching of cotton woven goods

A NEW Du Pont development greatly simplifies the bleaching of cotton woven goods—cuts over-all costs as much as 20% and still produces results equal in every way to those obtained with multi-stage systems.

With Du Pont's compact new process, boiling out and bleaching are handled simultaneously. This means you can maintain present production levels with half the equipment, half the floor space . . . or double production with existing equipment. Mechanical damage to cloth from handling is reduced, and savings of up to 50% in labor, steam, water and power are quickly realized.

We'll be glad to show you how your present bleaching system can be modified to operate on this new *one-step* principle. Or, if you're planning to install new equipment, we'll show you how the Du Pont process can substantially cut the cost of your initial investment.

NOTE: *Du Pont does not build or sell bleaching equipment. However, Du Pont systems are available* now *from leading equipment manufacturers.*

Send coupon for details

DU PONT PEROXIDES

ALBONE® hydrogen peroxide, 35% and 50%

PERDOX® sodium borate perhydrate

SOLOZONE® sodium peroxide

Sodium perborate tetrahydrate

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department AD-66
Wilmington 98, Delaware

☐ Please send full information about the new Du Pont single-step continuous bleaching system.

Name_____

Title_____

Firm_____

Street & No._____

City_____ State_____

Problems in Producing 'Wash N' Wear' Fabrics

by JAMES M. MYERS

Manager, Salisbury, N. C., Office

When we use the term, "Wash N' Wear", I am reminded of the question, "What is the Truth"? What is "Wash N' Wear"? Is the term just another advertising phrase to sell a lot of goods, or is this one the real McCoy?

There are many current problems facing us in the turning out of all cotton fabrics that are actually "Wash N' Wear". We will name a few of these:

Not all fabrics, due to their construction, yarn size, twist factor, type of cotton, etc., lend themselves to this type of finishing operation. The job finisher cannot please his customers across the board.

There is a serious sewing problem, because a crease resistance of over 3.4x3.4 causes seams to pucker, bulge, and look untidy in general in the finished garments. A fabric to be truly "Wash N' Wear" must be very resistant to crushing, and permanently so. It must also have these qualities while in the wet state.

There is a serious degradation problem, because very few chemicals on the market today will do this job correctly without greatly damaging the fabric strength-wise.

Plants must have the equipment, trained personnel and technical know-how to control this finishing operation. The finishing job is one of high skills in the application of complex resins, catalysts, plasticizers, softeners, etc.

The cost factor will play an important part in finishing "Wash N' Wear" all cotton fabrics. A good job will cost more to produce than current resin finishes. With competition from abroad increasing steadily, there is a question whether cheap fabrics, like 80 x 80 prints, will bear this added cost. We feel it will, although others in the industry say it will not.

The worst problem I saved for last. Many "Wash N'Wear" fabrics are on the market today that are no better than a fair resin job. What effect this will have on the long-range "Wash N' Wear" picture we do not know. Our guess is that it will not be good.

Standard Chemical Products has the equipment, the chemicals and the technical know-how to do a proper job. Samples and technical information will be gladly furnished by contacting our Sales Office in Hoboken, N. J., or Charlotte, N. C.

Standafin 77 for Whiteness

If you are looking for the whitest possible finish on synthetics, one that will remain white indefinitely during mill or shelf storage, then Standafin 77 is the product to use. Write or call today for complete information on this durable, non-irritation finish.

Meet Us at Convention

You probably have some ideas on "Wash N' Wear" problems that Jim Myers hasn't covered on this page. Let's discuss them the next time we meet; probably at the national AATCC convention in Atlantic City, September 21-24. Look us up, we'll be glad to see you.

Standardgrams

Stanset D 40's Crease Resisting Quality Lauded

We have received many enthusiastic and flattering reports from customers on the low chlorine retention and high crease resistant properties of our new chemical reactor resin, Stanset D 40.

A modified melamine type resin, Stanset D 40 requires slightly more catalyst than the acid type; 12-15% Stanset D 40 (on weight of resin mix) will give crease resistance around 3.2 x 3.1, and the chlorine degradation can be maintained below 25%. We recommend 0.5-1.25% of Catalyst 100 for Stanset D 40 and a curing temperature of from 310 F.-320 F. for seventy seconds.

Fabrics finished with Stanset D 40 will hydrolize only slightly when subjected to severe alkali washings. Fabrics treated with Stanset D 40 and cured to a good crease angle are highly resistant to yellowing when subjected to hot chlorine washes.

A combination of 5-8% Stanset D 40 and 10% Stanset L C N has been found to be very good for low chlorine retention on dress fabrics. When Stanset D 40, Stanset L C N and Stanset S-100 are applied to fabrics that have zero chlorine retention, are properly scoured free from alkali, are cured to a reasonably good crease angle, are properly washed and then tested by the procedure set forth by the AATCC, the chlorine degradation will be from 0-10%.

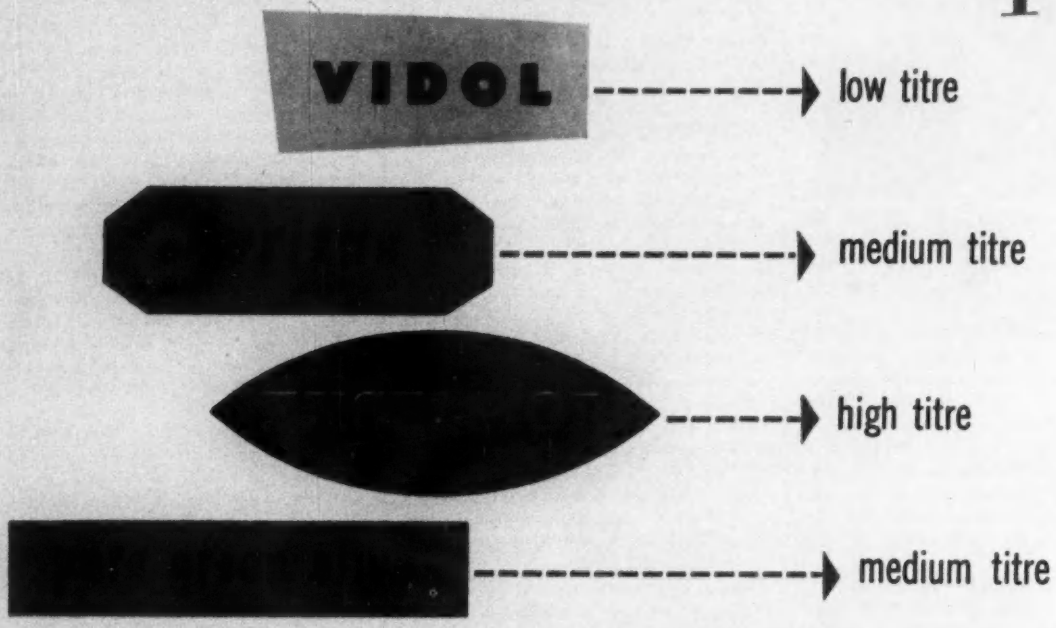
Physically, Stanset D 40 is an essentially colorless liquid with a weak aldehyde odor. Other typical characteristics are:

pH : 9.0 – 9.6
Specific Gravity : 1.158 – 1.160
Stability : 6 months, normal storage
Solubility in water : miscible in all proportions with hot or cold water.

If you have not already received our technical bulletin on Stanset D 40 drop us a line, or call. We will be happy to send one to you. It contains much more information than the few facts presented here.

STANDARD CHEMICAL PRODUCTS, Inc.
HOBOKEN, NEW JERSEY · CHARLOTTE, NORTH CAROLINA
CHATTANOOGA, TENN. PATERSON, N. J. SWANSEA, MASS. SALISBURY, N. C.
SUNBURY, PA. SACRAMENTO, CALIF. GREENSBORO, N. C. GREENVILLE, S. C.

the big 4 in textile flake soaps



● Any way you figure it, quality soaps for quality results are a "must". That's why more and more dyers and finishers are taking advantage of the plus values of these and other members of the Laurel Soap family (Texsopon, Columbia, Palmtype, Arrow, and Crown), for better scouring, fulling, and soaping off.

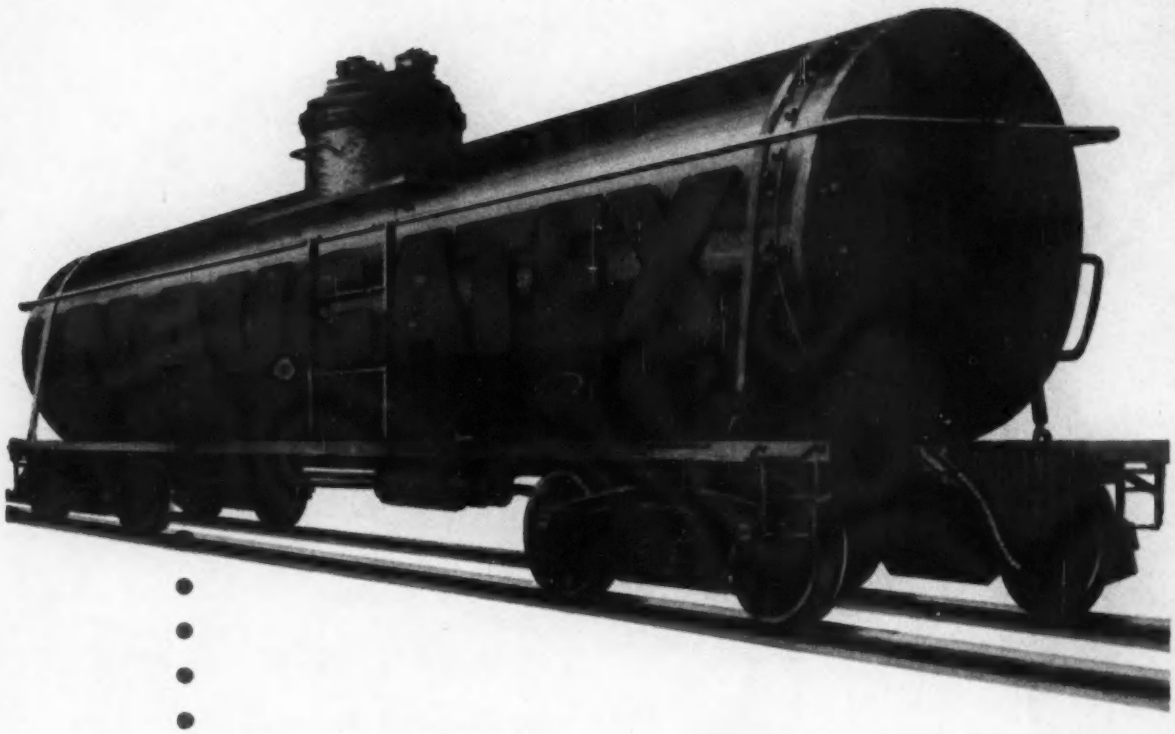
That clean lofty wool, those soft, perfectly fulled woolens and worsteds; clean, bright prints and vat and naphthol dyeings; completely degummed silks . . . all these can be yours with a Laurel *Quality* Soap.

Whatever your application, Laurel's long and varied experience is available to recommend the right soap to make your job pay performance dividends. For your convenience, you can obtain Laurel *Quality* Soaps from stocks at Philadelphia, Pa., Charlotte, N.C., Chattanooga, Tenn. and Paterson, N.J.

Laurel Quality Soaps are available in powder, bar solid and paste (potash) forms. Ask for samples.

Laurel SOAP MANUFACTURING CO., INC.
TIOGA, THOMPSON & ALMOND STS., PHILA. 34, PA.

Laurel Brand



the name you will be seeing— and hearing —more and more!

Naugatex® is the new trade name for Naugatuck GR-S latices... latices that are now available in drum, tank truck, and tank car lots direct from Naugatuck, Connecticut.

NAUGATEX... for the toughest applications!

Naugatex latices are used in tire cord, foam sponge, carpet and upholstery backing, adhesives and general paper treatment. In addition, Naugatuck produces latices custom-compounded to your specific needs to bring new versatility to your manufacture, new performance to your product, under the trade name LOTOLS.

Whatever your latex application, you can bet Naugatuck, the pioneer in synthetic and natural latices, has the latex you need... or will compound it to suit your particular application, for Naugatuck has compounded more new varieties of synthetic rubber than all other laboratories. For further information on Naugatex, and its most recent developments, write to us on your company letterhead.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

SWIFT'S SOAPS

TREAT FINE WOOLENS RIGHT

Fifty years of serving the needs of the Textile Industry have taught us a valuable lesson . . . one whose benefits are passed back to the industry in every bag, drum or carload of Swift's Soap shipped:

Textile Industry needs are best served by service.

Swift's experience gained in day to day *living* with textile problems have resulted in a diversified line of soap products that are *geared* to today's practiced skills of dyeing, fulling and scouring. There's a Swift's Soap for the textile finishing job regardless of temperature; or for use where fine dyeing calls for complete, yet gentle scouring. There's one for *your* set of requirements . . . one to give sure, skilled and experienced service where fine woolens need the right treatment.

Yes, Swift's Soaps treat fine woolens *right* . . . and Swift's salesmen will treat *you* right . . . 375 Swift's distribution points throughout the U.S. and Canada can provide prompt, courteous, *resourceful* service on the products listed at left. Write or call for further details today and remember . . .

FOR FAST DELIVERY AND RESOURCEFUL SERVICE

375 Swift's distribution points located throughout the U.S. and Canada can give you immediate delivery on these Swift-quality soap products:

VERTEX FLAKES

●

557 FLAKES

●

WHITE RIBBON CHIPS

●

WOOL FLAKES

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

SWIFT & COMPANY

SOAP DEPARTMENT

4115 PACKERS AVENUE • CHICAGO 9, ILLINOIS

Swift
1855 CENTENNIAL 1955
TO SERVE YOUR INDUSTRY BETTER

IN OUR 56 years of chemical experience, we've never lost that wholehearted desire to treat our customers as staunch friends . . . to bend over backwards when the situation calls for it . . . and to give complete customer satisfaction. ¶We'd relish the opportunity to show you.

COLUMBIA-SOUTHERN

CHROME CHEMICALS

SODIUM BICHROMATE ANHYDROUS SODIUM SULPHATE

SODIUM CHROMATE POTASSIUM BICHROMATE (powdered or granular)

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

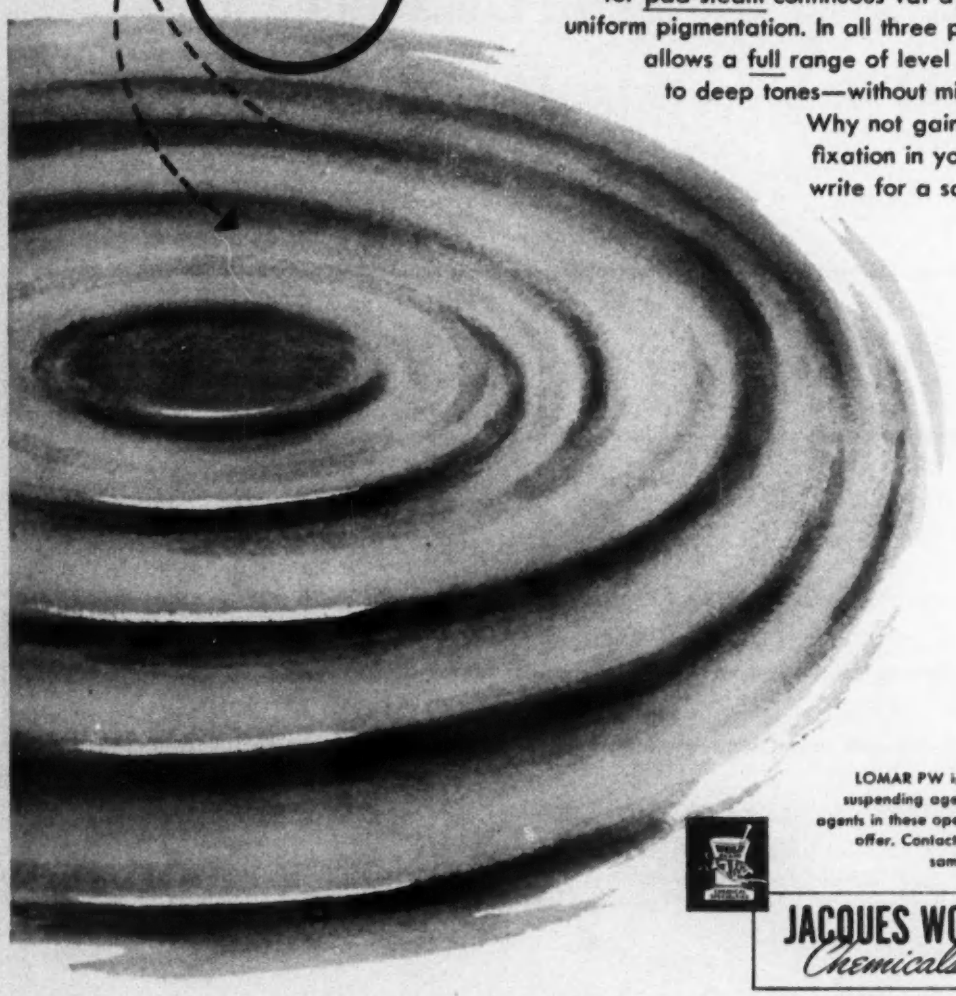
DISTRICT OFFICES: Cincinnati • Charlotte
Chicago • Cleveland • Boston • New York
St. Louis • Minneapolis • New Orleans
Dallas • Houston • Pittsburgh
Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited
and its Commercial Chemicals Division

Stop Migration of Pigment Colors with

SUPERCLEAR

An Approved Medium Recommended by Dyestuff Manufacturers

When pad-dyeing synthetics with dispersed pigment colors, use Superclear in the pad liquor to eliminate shading from selvedge to selvedge—and to end tailing off of shades. Use Superclear in vat-acid continuous dyeing to obtain level shades with any mixture of vat dyes. Use Superclear for pad-steam continuous vat dyeing for absolutely uniform pigmentation. In all three processes Superclear allows a full range of level shades from pastels to deep tones—without migration of pigment! Why not gain this same excellent fixation in your own operation—write for a sample and complete information today.



LOMAR PW is recommended as a successful suspending agent. For those who add wetting agents in these operations, we have a full line to offer. Contact Jacques Wolf today for your sample and complete information.

JACQUES WOLF & CO.
Chemicals PASSAIC, N.J.

Plants in: Clifton, N.J., Carlstadt, N.J., Los Angeles, Calif.

For excellence in color values

use OK PRINT GUMS

OK BRAND

THE HUBINGER COMPANY

KEOKUK, IOWA

Ask your nearest Hubinger textile technical sales representative to show you the advantages of OK Textile Starches.

Your most exacting requirements in printing and finishing are satisfied with the superior quality and controlled uniformity of Hubinger's OK Textile Starches. Try these outstanding products:

OK HUBCO PRINTING GUM #30FL provides a very sharp line, and shows excellent compatibility with alkali as well as acid colors. One of the most economical of all printing gums, it may be cooked on a Votator or in a kettle continuously at temperatures up to 185°F.

OK PRINTEX #200 is a premium-type printing gum which gives unusual color value and sharpness. Extremely heavy bodied, it is effective at low concentrations. Its excellent rinsability produces cloth with a soft hand.

OK LVL GUM virtually assures perfection in Plisse printing. Used as a thickener and carrier for the alkali, it has amazing stability and does not lump.

OK HUBCO #110 is a very clear, thin finishing starch, giving a nice hand without masking or hiding colors of the cloth.

Ira L. Griffin & Sons
Southern Agents
P. O. Box 1576
Charlotte, N. C.
(Phone: Franklin 6-5583)

Joe R. Myers
1817 Dell Drive
Columbus, Georgia
(Phone: 7-2244)

Carl P. Merritt
Box 346-A
Piedmont, S. C.
(Phone: Greenville 2-0424)

New York Office
500 Fifth Avenue
New York 36, New York
(Phone: Longacre 5-4343)

Boston Office
192 State Street
Boston, Massachusetts
(Phone: Capitol 7-3268)

Also offices in Chicago and Los Angeles

Formulas FOR Fabulous Fabrics

REPCO RF

Combines ribbon finish and water repellent into a single product for a single application. No curing necessary, dries at normal drying temperature. Eliminates mark-off.

JESCO #30

A Cationic softener obtaining a full soft hand. Excellent permanency and resistance to laundering and dry cleaning. May be used on all fibers, with negligible effect on white and colors.

FINISH S #33

A softener and plasticizer for use with Urea Formaldehyde and Formaldehyde Resins. Makes resin finishes softer by reducing harshness and brittleness—yet retains crease resistance and stability.

JESCO D-6

A high quality answer to the problems of greige goods scouring and boiling off. Equally efficient in acid solutions, hard water, alkaline baths. Excellent stability under all temperatures and conditions.

JESCO 59W

A combination of finishing gums for imparting body, weight and a firm hand to goods—especially low count fabrics. No discoloration of whites or dyed fabrics. Readily water soluble. Improves draping qualities.

PINETEX

The ideal detergent for cotton, rayon, blended synthetics etc. requiring rapid boil-off. Contains no tallow oil soap. Perfectly stable in high alkaline baths. Excellent for Jig box use and in many oxidizing agents.

RESIN 300

A modified Urea Formaldehyde providing an extremely crisp finish of excellent dimensional stability. Ideal for crush-proofing nylon, dacron and orlons.

RIBBON FINISHES: RESIN RF and RESIN 112

High quality alkyd resins which impart a crisp, firm hand to acetate satins. RF and 112 provide excellent results without mark-off or decrease in original lustre.

RESIN SYRUP J5

A high solids Urea Formaldehyde Polymer for imparting a desirable firm hand to suitings.

RESIN 107

A 55% polyvinyl acetate emulsion for fabric stiffening. Ideal for cottons, nylons and ninons.

Textile Finishes

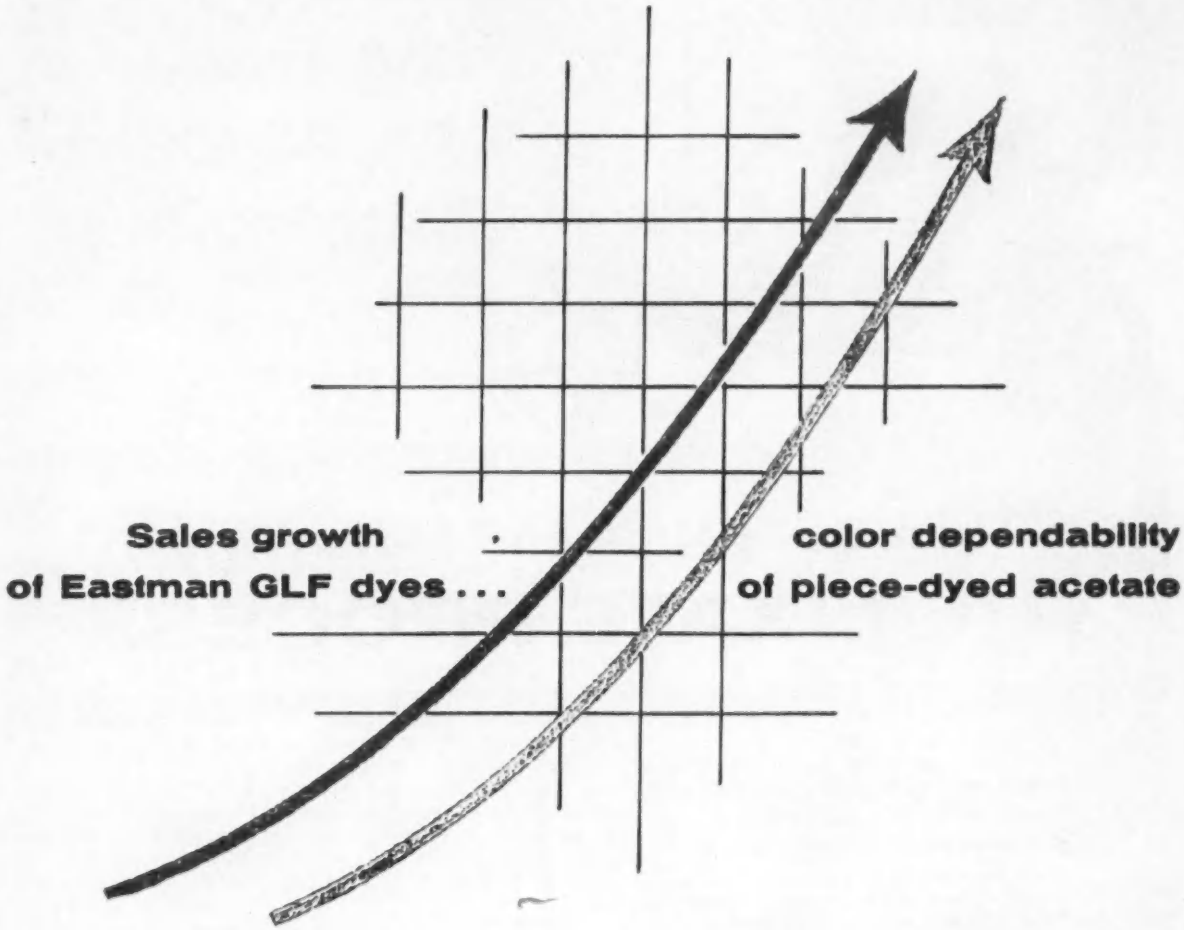
from

JERSEY STATE CHEMICAL CO.

59 Lee Avenue Haledon, N. J.

Write Today for Complete Information

Southern Representative: Charlie Waters
3919 West Grace St., Richmond, Virginia



GOING UP-TOGETHER

Hand-in-hand with the sales growth of Eastman GLF dyes goes the definite trend to quality piece-dyed acetate . . . acetate with outstanding fastness to light and gas.

Make no mistake about it, the trend is strong. High-quality GLF dyes already account for a healthy percentage of Eastman's total acetate dyestuff sales.

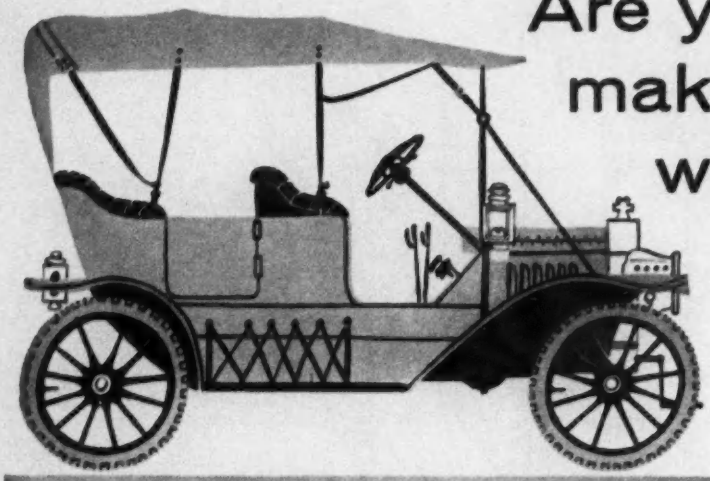
This rapid growth in sales didn't just happen—GLF dyes have *earned* their popularity. They give dyers a welcome chance to reduce costly complaints and returns. And Eastman GLF dyes are easy to work with, too. Any house equipped to handle acetate is equipped to apply GLF colors.

More and more cutters, converters and manufacturers are insisting on use of Eastman GLF dyes. Consistent advertising points out to them that GLF colors, properly applied, give acetate a light fastness comparable to that of many vat-dyed cottons . . . a gas fastness that exceeds drapery trade requirements.

Make sure your customers know you can supply them with piece-dyed acetate that offers the color dependability of GLF dyes.

Eastman Acetate Dyes are sold in the United States by Eastman Chemical Products, Inc., a subsidiary of Eastman Kodak Company, in Kingsport, Tennessee and Lodi, N. J. On the West Coast through Wilson Meyer Co.: San Francisco, Los Angeles, Portland, Seattle and Salt Lake City. In Canada, through Clough Dyestuff Company, Ltd., St. Laurent, Quebec.

—the finest acetate fibers and dyes are made by **Eastman**



Are you still making Brine with "Model T" methods?

Then Save Time and Money with

THE LIXATE PROCESS

In a single piece of equipment, The Lixate Process combines a method of dissolving rock salt without agitation and a method of filtration.

MAKES BRINE AUTOMATICALLY

The Lixator makes and filters all the brine you want or need with no human aid whatever and can be located *anywhere*—even hundreds of yards from buildings and points of use.

UNIFORM QUALITY AND STRENGTH

The Lixator produces *only* 100% fully-saturated brine, self-filtered, crystal clear. May be accurately reduced in strength, without testing, without delays.

PIPED TO POINTS OF USE

Turn a tap, there's your brine—*where* you want it, *when* you want it. No handling of salt or finished brine. Economy! Convenience! Efficiency! All Lixator installations are custom-engineered.

EVAPORATED SALT DISSOLVERS, TOO

Rock Salt or Evaporated Salt—International provides both in all forms. It provides also any technical advice on salt, brine, or auxiliary equipment, required by users, for either kind of salt.

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Scranton, Pa.

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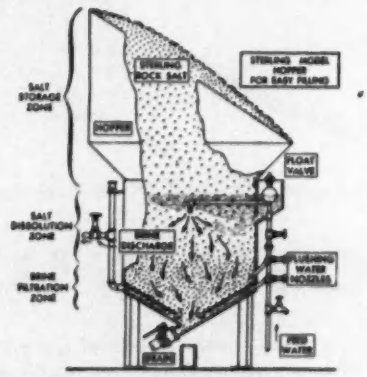

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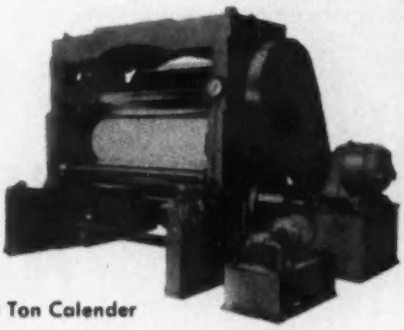

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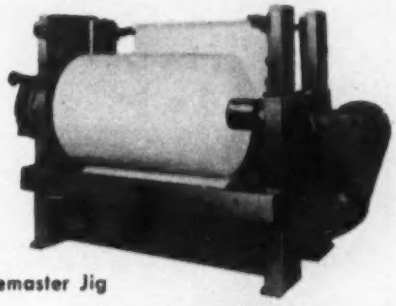

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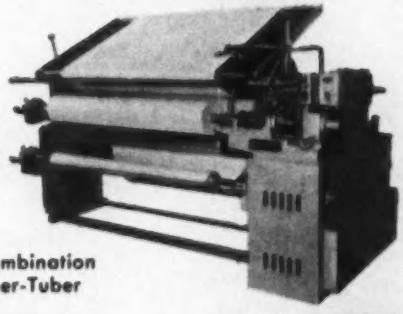

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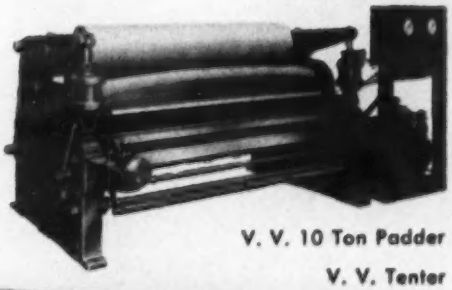

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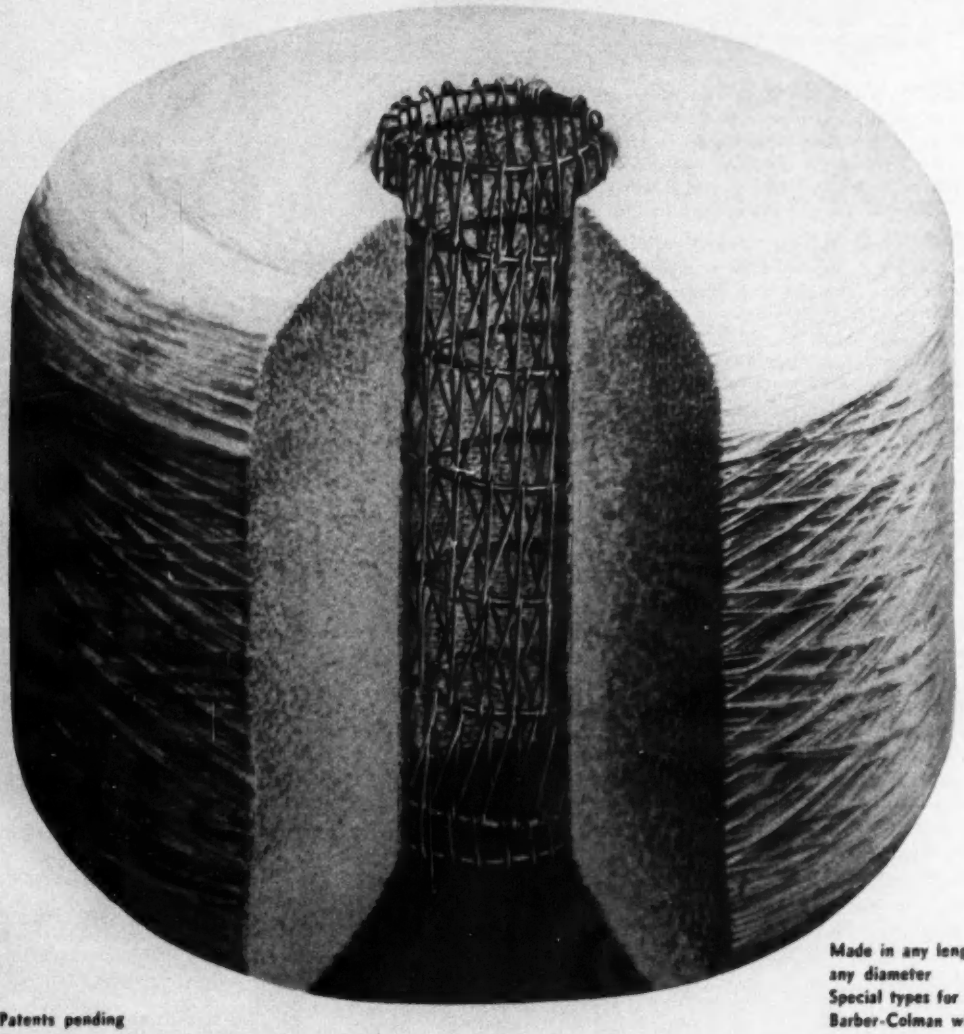

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Antislip	FIBA WELD B	Water-Soluble Formaldehyde Condensate
Antislip	FIBA WELD PJ	Polymer Blend
Antistatic	CATEX	Quaternary Ammonium Product
Antistatic Agent	MOLLISAN	Non-Ionic Ester Type
De-embrittling Agent	MOLLISAN	Non-Ionic Ester Type
Dispersant	NSAE	Sodium Alkylnaphthalenesulfonate
Dispersant	MAPROFIX	Sodium Lauryl Sulfate
Dispersant	NEUTRONYX 400	Aromatic Polyglycol Ether
Dispersant	XYNOMINE	Sodium Amide Sulfate
Dye Fixative	XYNO FIX FL	A Complex Nitrogenous Condensate
Dye Fixative	XYNO SET B	An Imidazoline
Dyeing Assistant	ALIPHATIC ESTER SULFATE	Anionic Dyeing Assistant
Dyeing Assistant	NSAE PASTE	Sodium Alkylnaphthalenesulfonate
Dyeing Assistant	DARONYX	Dispersible Swelling Agent
Finishes		
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Bodying	XYNO PERM 1591-60	Water-Soluble Protein
Crush-Resistant	NCF PASTE	Urea-Formaldehyde Resin
Crush-Resistant	LIQUID RESIN 55	Water-Soluble Urea-Formaldehyde Resin
Crush-Resistant Component	XYNO RESIN G-36	Aqueous Solution, Modified Urea-Formaldehyde Resin
Duller	DULLATONE CA	TiO_2-Base Cationic Dispersion
Duller	DULLATONE 60	TiO_2-Base Anionic Dispersion
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Sewability	XYNO FINISH 9909	Cationic-Nonionic Compounds
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Non-Ionic	MOLLISAN	Non-Ionic Ester Type
Non-Yellowing	MOLLISAN	Non-Ionic Ester Type
Yellowing Resistant	XYNO FINISH 9909	Cationic-Nonionic Compounds
Gas Fading Inhibitor	NEUFUME DMX	Cationic Aromatic Amine Dispersion
Penetrant — Regular	PHI-O-SOL WA	Sodium Fatty Acid Ester Sulfate
Penetrant — Low Foaming	NEUTRONYX 511	Aromatic Polyglycol Ether
Scouring Agent	ONYXOL 9162	Fatty Acid-Alkanolamine Condensate
Scouring Agent	MAPROFIX	Sodium Lauryl Sulfate
Scouring Agent	MAPROTEX	Sulfated Fatty Alcohol Blend
Synthetic Detergent	NEUTRONYX 600	Aromatic Polyglycol Ether
Synthetic Detergent	SOROLENE G PASTE	Sodium Alkylnaphthalene-Sulfonate
Tar and Grease Remover	DEWAXIT	Self-Emulsifiable Solvent Mixture
Tar and Grease Remover	NEUTRONYX 834	Polyalkylene Ether Condensate of Fatty Acids
Wetting and Rewetting Agent	PHI-O-SOL WA	Sodium Fatty Acid Ester Sulfate
Wetting and Rewetting Agent	SOROLENE G PASTE	Sodium Alkylnaphthalene-Sulfonate
Wetting Agent	NEUTRONYX 600	Aromatic Polyglycol Ether
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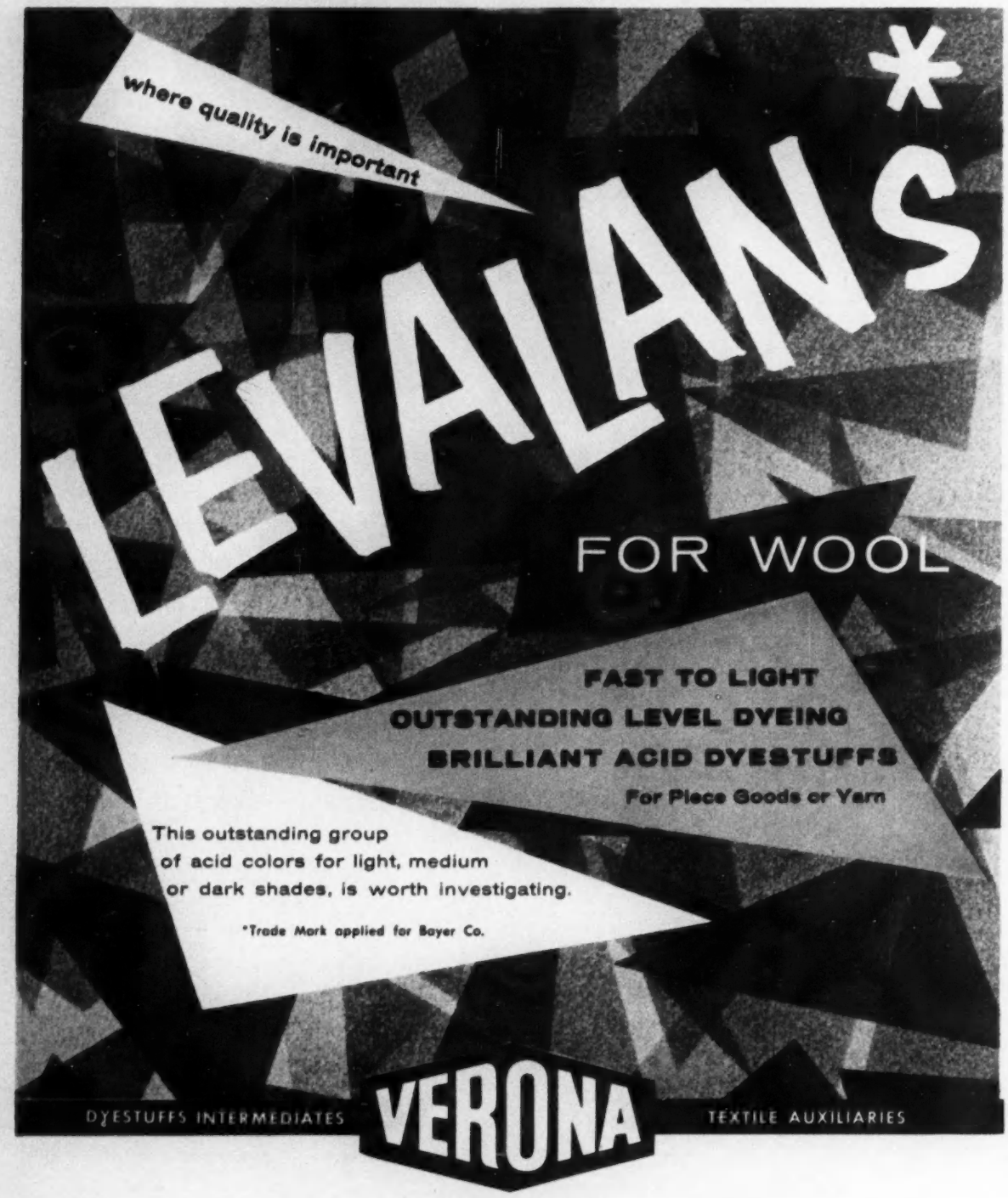

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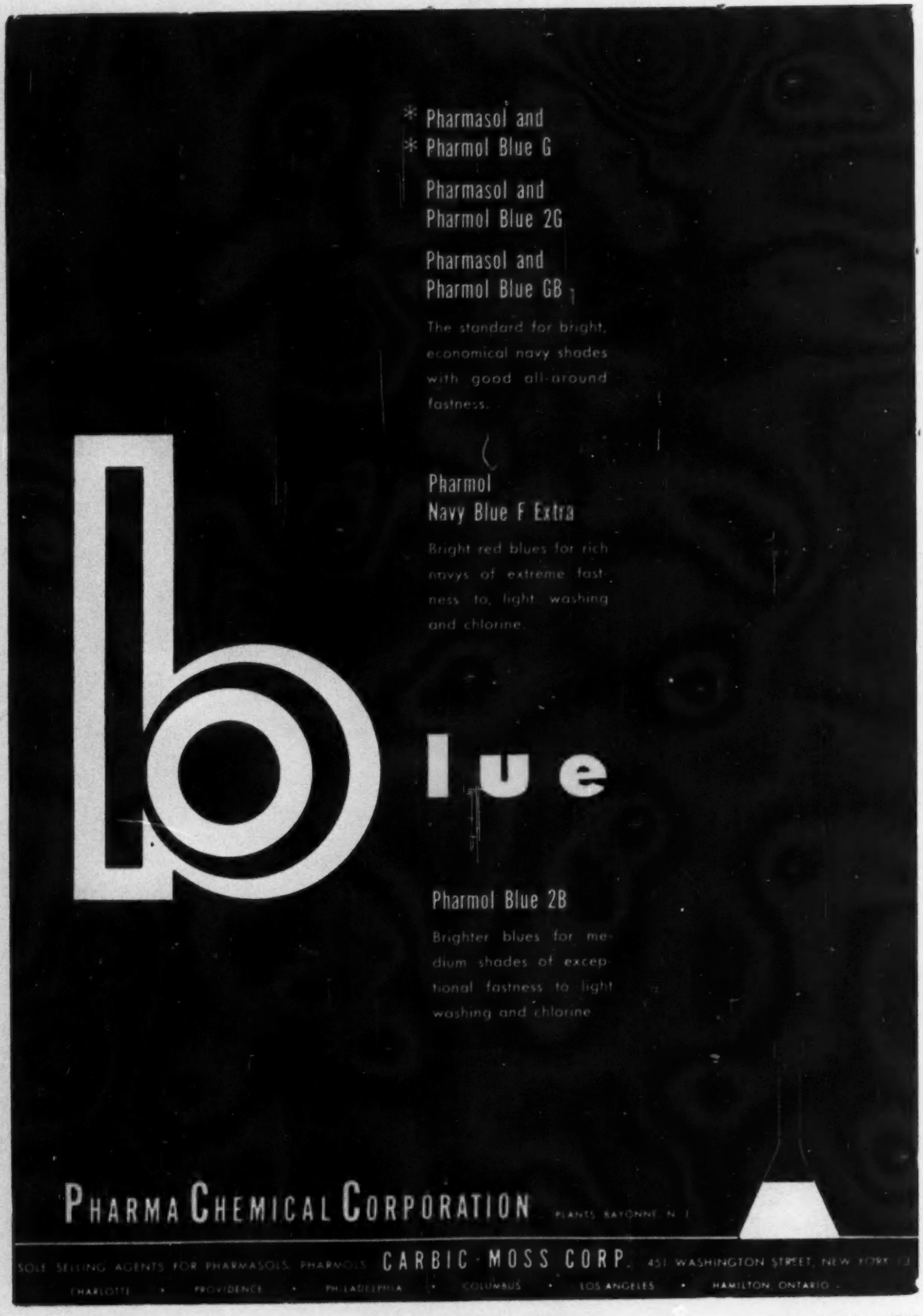
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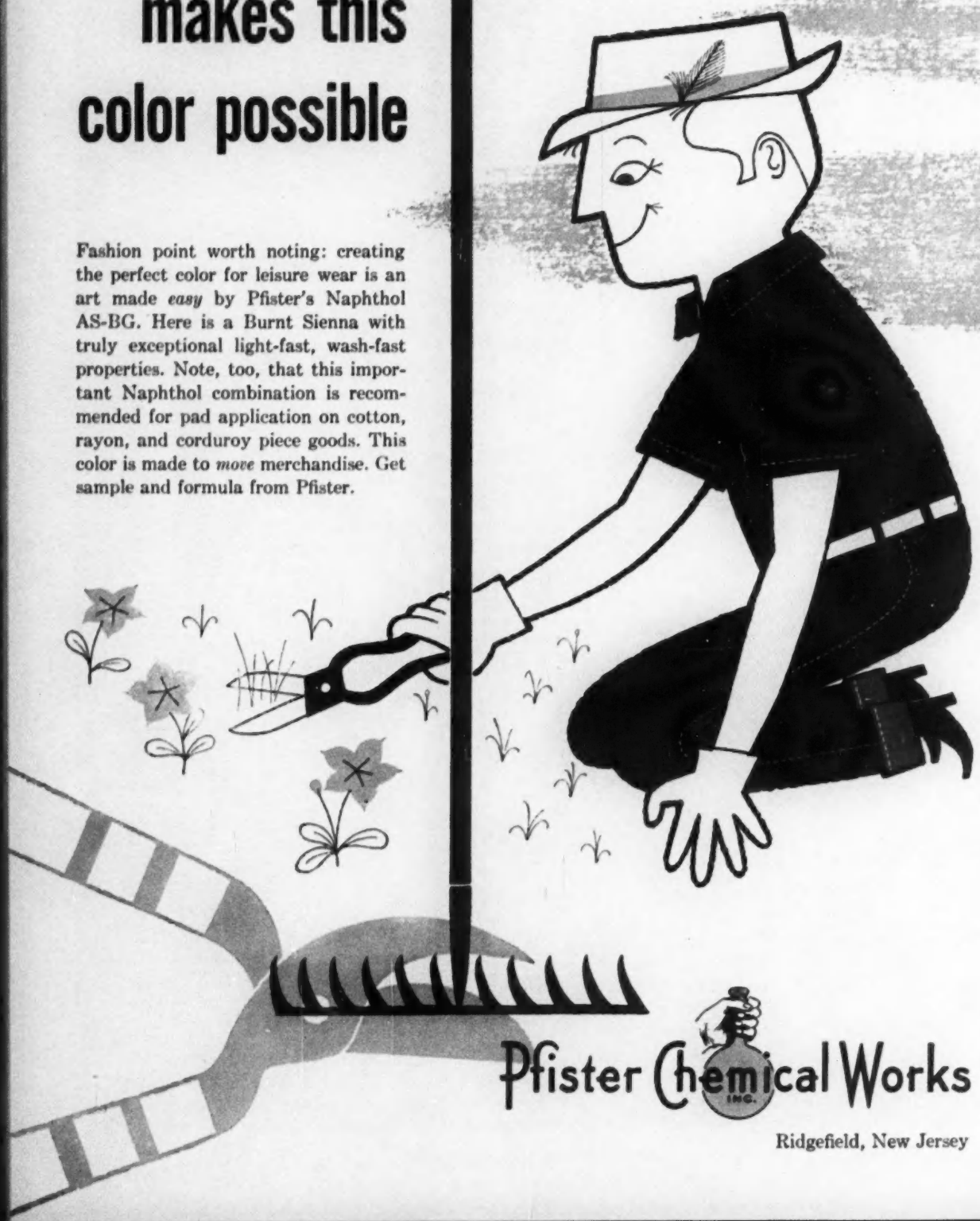

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VOLUME 44 SEPTEMBER 26, 1955 NUMBER 20

DETERGENCY MEASUREMENT USING ARTIFICIALLY-SOILED CLOTHS*

F L DIEHL and J B CROWE

Procter and Gamble Company, Cincinnati, Ohio

ARTIFICIALLY-SOILED cloths have found wide acceptance in the textile, laundry, and detergent industries in the evaluation of detergent products and methods. Manufacturer and operator alike faced with an optimum selection from a multitudinous array of soaps, synthetic detergents, detergency aids, and combinations thereof have resorted to the use of so-called "standard" soiled cloths in evaluation of detergency performance. Too often such cloths are "standard" only in name, in that they fail to meet one or more of the requirements usually expected of a soiled test fabric. These are:

1. The soiled cloths should rank detergent products in the same order as obtained in actual usage tests under practical conditions.
2. The soiled cloths should give reproducible results from batch to batch of cloth as well as within batches of cloth.
3. The soiled cloths should have sufficient sensitivity to distinguish known differences between detergents with a minimum expenditure of time and effort.

The first of these requirements, that of correlation with practical tests, is the most important of the three, since a wrong answer on soiled test cloths may result in serious economic losses. However the other requirements necessarily follow in order that the investigator will know when he has correlation with practical tests.

Few published papers on development of artificially-soiled cloths attempt correlation with practical tests. Exceptions are papers by Harris and Brown *(4)*, Sanders and Lambert *(6, 11)*, and Vaughn *(14)*. Other investigators *(5, 8, 15)* have compared several types of soiled test fabrics in the evaluation of detergent systems or types of detergents. A number of the soiled cloths used are commercially-available and presumably were calibrated against practical tests on a given series of detergent products. The lack of agreement among test fabrics reported is an illustration of the limitations on their use; that is, successful correlation on a few detergent systems or types of detergents does not necessarily imply that application of the "standardized" soiled cloth to testing of other systems or types will continue to show correlation with practical tests.

The present paper serves to re-emphasize the lack of agreement between different types of artificially-soiled cotton test fabrics in evaluation of detergency performance of representative detergent products and the limitations on their use.

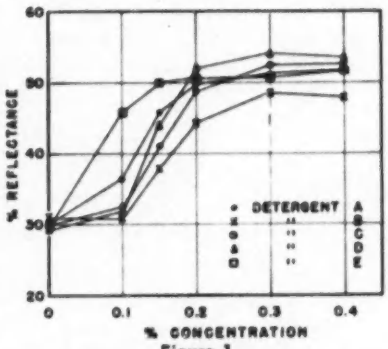

Figure 1
Detergency as measured by fabric No. 1.

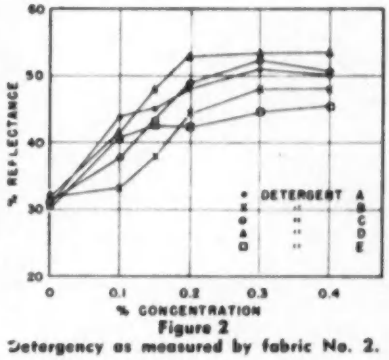

Figure 2
Detergency as measured by fabric No. 2.

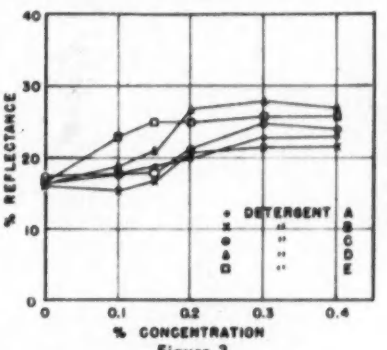

Figure 3
Detergency as measured by fabric No. 3.

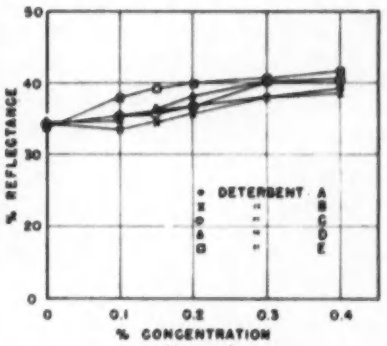

Figure 4
Detergency as measured by fabric No. 4.

EXPERIMENTAL

SOILED TEST CLOTHS —— Four different types of artificially-soiled cloths were used. Three of these are commercially available; the fourth is from a private laboratory. Different batches of each test fabric were ordered at two-week intervals, such that two or three batches of each were available for test. The test swatches used were randomized within batches.

WASH TEST METHODS —— The Launder-Ometer *(7)* method used was

* Presented at a meeting of the American Oil Chemists' Society and published in their Journal.

TABLE I

COMPARATIVE RANKING OF FIVE DETERGENT PRODUCTS BY FOUR DIFFERENT DETERGENCY TEST FABRICS AND PRACTICAL TESTS AS TO MAXIMUM CLEANING

Fabric No. 1		*Fabric No. 2*		*Fabric No. 3*		*Fabric No. 4*		
Detergent	*Reflectance*	*Detergent*	*Reflectance*	*Detergent*	*Reflectance*	*Detergent*	*Reflectance*	*Practical*
D	54.5	D	53.5	D	28.3	E	40.3	D
C	52.8	C	52.5	E	25.8	D	39.8	C
A	51.8	A	50.8	C	25.0	C	39.8	A
E	51.2	B	48.5	A	22.8	A	38.3	E
B	48.8	E	44.5	B	21.3	B	38.3	B
(Yardstick*)	(2.4)		(2.5)		(1.1)		(0.8)	

* An estimate of the reliability of the mean reflectance values given in Table I enables a judgment of the significance of the data. This is obtained by computation of standard error values for the means by statistical techniques described by Brownlee *(1)* and calculation of a "yardstick" applicable to the k(k—1)/2 contrasts, where k is the number of means to be compared. A conclusion as to the reality of a difference equal to the calculated yardstick will be in error only one time in 20 experiments. The yardstick is based on a method proposed by Tukey *(13)*.

TABLE II

RANK CORRELATION OF DETERGENCY TEST FABRICS WITH PRACTICAL TESTS

Detergent	*Practical tests*	*Fabric No. 1*	*Fabric No. 2*	*Fabric No. 3*	*Fabric No. 4*
D	1	1	1	1	2.5
C	3	2	2	3	2.5
A	3	3	3	4	4.5
E	3	4	5	2	1
B	5	5	4	5	4.5
Correlation coefficient* with practical tests		0.90†	0.75	0.90†	0.55

* Spearman's rank correlation coefficient calculated as given in Snedecor *(12)*.
† Significant at 0.05 probability level, *ie* there is a probability of 1 in 20 that the correlation is zero, based on Olds *(9)*.

essentially that described by Crowe *(2)* for cotton fabric, with certain exceptions:

1. The water hardness was 7 gr/gal (120 ppm).
2. The temperature was 130°F (54.5°C).
3. Volume of test solution was 200 ml.
4. Duration of wash was 20 minutes.
5. Two 2½ in x 2½ in soiled swatches and two clean swatches of the same size were placed in each pint jar. The clean swatches were bleached white cotton print cloth, unsized, thread count 84 x 68, weight 3.0 oz/sq yd.

DETERGENTS USED——The five detergents used are commercially available soaps and built synthetics. Among these are built and unbuilt soaps, built fatty alcohol sulfate, built alkylarylsulfonate, and built nonionic.

NUMBER OF TESTS——All four soiled test fabrics were evaluated by performance tests, on all detergent products at concentrations 0, 0.1, 0.15, 0.2, 0.3, and 0.4% on an "as-is" product basis. Duplicate tests were run at each concentration, with the exception of 0 and 0.4%.

In addition, two or three batches of each soiled cloth were evaluated in the same manner, with duplicate runs on at least one batch of each cloth.

GRADING OF TEST PIECES——Reflectance measurements were made on the soiled test pieces and whiteness retention swatches after washing. The Photovolt Reflection Meter, Model 610 (10), was used for this purpose.

COMPARATIVE RANKING OF PRODUCTS AS TO DETERGENCY

Results of wash tests on the four soiled fabrics are shown in Figures 1-4, respectively. Each point on the curves, with the exception of those at 0 and 0.4% concentration, is an average of the reflectance of 16 swatches. Each point at 0 and 0.4% concentration is an average reflectance of 8 swatches.

In general, it will be noted that all fabrics do not rank the detergents in the same order. The lack of agreement is best illustrated by selected pairs of detergents as in Figures 5 and 6.

In Figure 5, fabrics 1, 2, and 3 show an advantage for Detergent A compared to Detergent B whereas fabric 4 shows no difference. The situation is more serious where actual reversals of order are observed, as in Figure 6. Fabric 2 shows an advantage for Detergent A over Detergent E; fabric 1 shows substantially equal detergency whereas fabric 3 and 4 show an advantage for Detergent E.

For purposes of simplicity, further discussion of Figures 1-4 will be confined to results at the 0.3% concentration since this point is approximately that at which maximum detergency occurs. At this concentration the comparative ranking of the various detergents may be summarized as in Table I.

Note that detergents D, C, A, B are rated in that order by each of the four soiled fabrics. Detergent E is ranked successively fourth, fifth, second, and first by fabrics 1 to 4. Use of a bar in Table I to bracket several mean values indicates no experimental evidence of significant gaps within the group.

CORRELATION WITH PRACTICAL TESTS

The comparative ranking of the detergent products by practical tests is also included in Table I. These ratings are based on wash tests on naturally-soiled clothes and practical laundry experience, both household and commercial. The probable order of cleaning is D, C, A, E, B, with differences among C, A, and E probably not discernible except under favorable conditions.

Based on the above rating as the true one, the degree of correlation of the test

TABLE III

STATISTICAL VALUES APPLICABLE TO DATA FROM WASH TESTS—FOR MEANS OF EIGHT JARS (16 SWATCHES) AS IN FIGURES 1-6

	Standard error of mean	*Confidence limits for means**
Fabric 1	.61	$\bar{X} \pm 1.2$
Fabric 2	.65	$\bar{X} \pm 1.3$
Fabric 3	.29	$\bar{X} \pm 0.6$
Fabric 4	.20	$\bar{X} \pm 0.4$

* The true value of the mean lies within the stated range subject to a risk of error of 1 in 20.

TABLE IV

SENSITIVITY OF SOILED TEST FABRICS WITH RESPECT TO DETECTION OF DIFFERENCES BETWEEN PRODUCTS

	(A) Observed spread Detergent D-Detergent B	*(B) Standard errors*	*Method I (A)/(B)*	*Method II Number of Launder-Ometer runs* required to detect real difference of magnitude (A)*
Fabric 1	5.7	.61	9.3	3
Fabric 2	5.0	.65	7.7	4
Fabric 3	7.0	.29	24.0	1
Fabric 4	1.5	.20	7.5	4

* Each run to consist of two jars, two swatches per jar. Prediction of number runs required based on Ferris, Grubbs, and Weaver *(3)*.

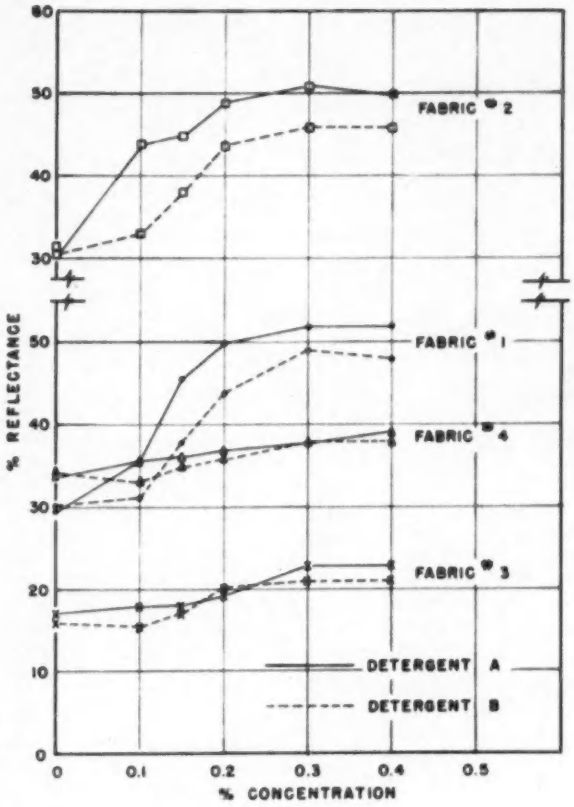

Figure 5
Detergency comparison of detergents A and B on four test fabrics.

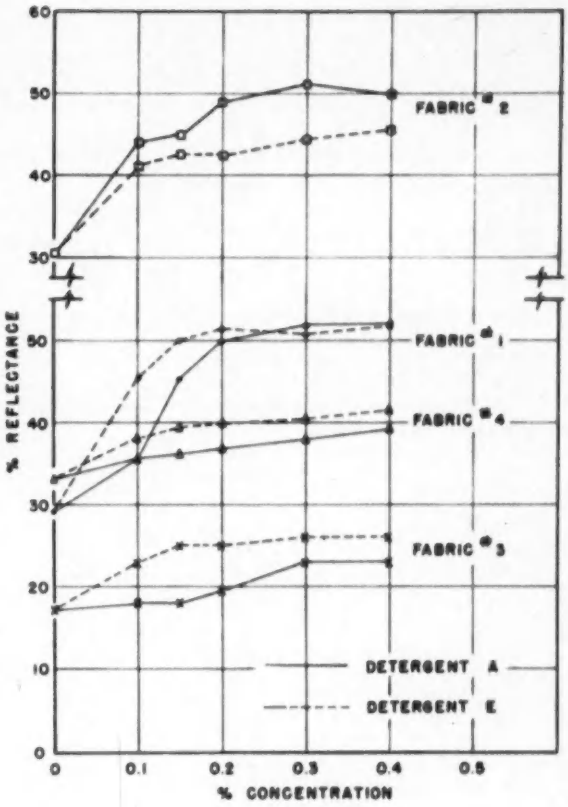

Figure 6
Detergency comparison of detergents A and E on four test fabrics.

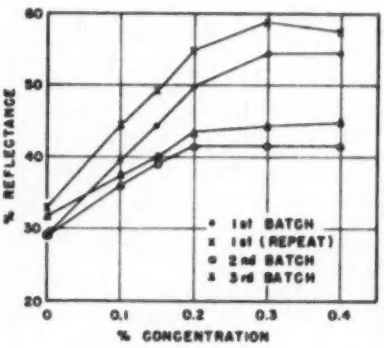

Figure 7
Differences in detergency among batches of fabric No. 2.

fabrics with practical tests is that given in Table II.

Calculation of the correlation coefficient shows that only fabrics 1 and 3 give a significant correlation with practical tests as to ranking of the five detergent products. It should be emphasized however that correlation with practical tests is not implied for other than the specific group of detergents here employed. The better correlation with practical tests obtained on fabrics 1 and 3 will not necessarily apply to an expanded series of detergent products.

REPRODUCIBILITY

REPRODUCIBILITY WITHIN THE SAME BATCH OR LOT——Inspection of the standard error values given in Table III affords an estimate of the reproducibility of test results with the various soiled test fabrics within a given batch. The lower the standard error of the mean, the greater the precision of results based on a given test fabric. Thus precision obtained with the various test fabrics is in the order fabric 4, 3, 1, and 2 with 1 and 2 about equal in precision.

REPRODUCIBILITY AMONG BATCHES——Wash test results on different batches of the same soiled fabric show that for each fabric, with the exception of fabric 2, the differences in cleaning levels among batches are no greater than the difference between duplicate runs on the same batch. With fabric 2 (Figure 7) however the first batch shows a considerably higher cleaning level than either the second or third batch.

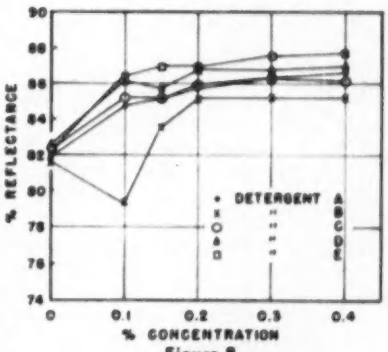

Figure 8
Whiteness retention measured with fabric No. 1 as soil source.

SENSITIVITY

Equally as important as reproducibility in test results is the ability of the soiled test fabric to discriminate between products as to known differences in detergency. A test fabric may give very precise results, yet the very reason for the high precision may be insensitiveness to differences in cleaning. Very often an increase in sensitivity results in decreased precision such that a compromise between these two characteristics is necessary.

TABLE V

SUMMARY OF WHITENESS RETENTION RANKINGS WITH FOUR DETERGENCY TEST FABRICS AS SOIL LOAD

Detergent	Reflectance	Detergent	Reflectance	Detergent	Reflectance	Detergent	Reflectance
Fabric No. 1		*Fabric No. 2*		*Fabric No. 3*		*Fabric No. 4*	
E	87.5	E	87.8	E	84.8	A	88.2
D	86.8	D	87.5	A	84.2	E	88.0
C	86.5	C	87.2	D	82.0	C	87.8
A	86.5	A	87.0	C	77.8	B	87.2
B	85.2	B	85.8	B	74.5	D	87.0
(Yardstick)	(0.7)		(0.9)		(0.8)		(0.6)

TABLE VI

PRECISION OF WHITENESS RETENTION DATA

	Standard error of mean	Confidence limits for means
Fabric 1	0.18	$\bar{X} \pm 0.4$
Fabric 2	0.24	$\bar{X} \pm 0.5$
Fabric 3	0.20	$\bar{X} \pm 0.4$
Fabric 4	0.15	$\bar{X} \pm 0.3$

A choice can best be made by determining which soiled test fabric gives the greatest spread between given detergents in terms of the precision of test results with the particular fabric. An alternative method of selection would be to determine the number of tests required to ensure detection of a difference between two specified detergents.

Both of these methods have been employed in Table IV in comparing the soiled fabrics. Detergents D and B were selected since the difference between them is the greatest in practical tests.

Fabric 3 represents the best compromise between precision and sensitivity inasmuch as the spread between detergents D and B is about 24 times the standard error of the mean. Furthermore only one Launder-Ometer run is required to detect a true difference of 7.0 reflectance units whereas three to four runs are required for the D-B difference with the other fabrics.

EFFECT OF SOILED TEST FABRICS ON WHITENESS RETENTION MEASUREMENT

Results of whiteness retention tests with the various soiled test fabrics as load are shown in Figures 8-11. (Reflectance measurements have been made on originally-clean white swatches included in each jar. The source of redeposited soil is the soiled test swatches themselves.)

The most striking difference between the fabrics is the spread exhibited between detergent products with certain fabrics (fabric 3) while others give little or no spread, *eg* fabric 4. For purposes of simplicity results are summarized in Table V for the 0.3% concentration only. (See footnote for Table I.)

There is some evidence of differences in ranking of detergent products as to whiteness retention with the various soiled test fabrics as load. However the differences between products are so small, except with fabric 3, that it is difficult to attach any significance to these ratings. As before, the use of a bar in Table V to bracket several mean values indicates no experimental evidence of significant gaps within the group. Statistical values for whiteness retention are given in Table VI.

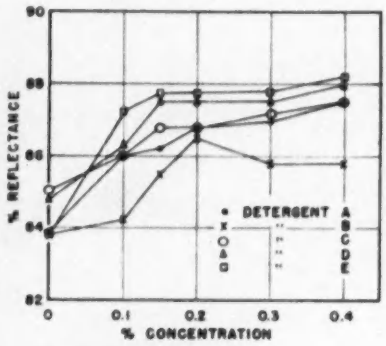

Figure 9
Whiteness retention measured with fabric No. 2 as soil source.

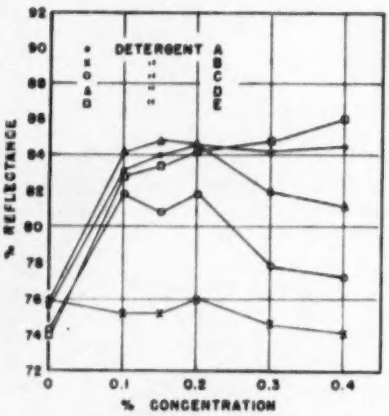

Figure 10
Whiteness retention measured with fabric No. 3 as soil source.

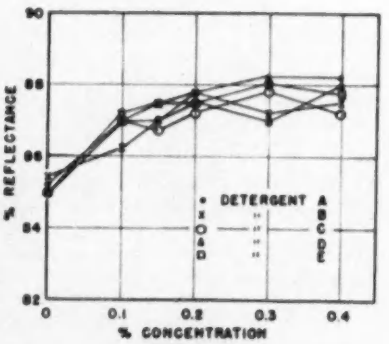

Figure 11
Whiteness retention measured with fabric No. 4 as soil source.

SUMMARY AND CONCLUSIONS

Four types of artificially-soiled clothes are compared in their ability to evaluate cleaning of representative detergent products. Three of these cloths are commercially available while the fourth is from a private laboratory. These are compared in their ability to rate detergents in the same order as naturally-soiled clothes rate detergents. Sensitivity and reproducibility of the various soiled cloths in measurement of soil removal and whiteness retention are studied.

Results show that artificially-soiled cloths must be used advisedly. There is no substitute for actual performance tests of detergent products under practical conditions. At best, artificially-soiled cloths are useful for "screening" purposes where positive test results are confirmed by practical tests.

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HISTORICAL NOTES ON THE WET-PROCESSING INDUSTRY

IX—Two Scottish Physicians and the Bleaching Industry

The Contributions of Home and Black

SIDNEY M EDELSTEIN
Dexter Chemical Corporation
New York, N Y

This is the ninth in a series of historical articles which the textile chemist and colorist will find of interest.

The author, a prominent science historian, is the founder of an outstanding collection of great works, documents and letters in the history of chemistry and related sciences.

Articles and illustrations in this series are from the author's library.

INTRODUCTION

LAST fall Denis Duveen mentioned to me that he had just purchased from a London bookseller a little volume published in Dublin in 1771, which apparently contained an hitherto unknown paper by Joseph Black. Knowing of my interest in dyeing and bleaching, he further pointed out that this little essay by Black was actually an appendix to a larger work entitled, "Experiments on Bleaching," by Francis Home. While I was quite familiar with the work of Francis Home on bleaching, which was first published in Edinburgh in 1756, I had never heard of this Dublin edition nor of any connection between the work of the two men.

After some persuasion, Mr Duveen agreed to turn the little volume over to me with the understanding that I would try to dig out the connection between the work of Home and that of Black, and the special meaning of this Dublin edition, if any. My study has indicated that this little book is more than a bibliographical curiosity, for it marks a real technical advance in both the bleaching and chemical industries. This volume, which contains the work of a practical technologist supported by the sound theory of a great chemist, marks the overthrow of superstitions concerning the use of various alkalies in the bleaching industry that had existed for hundreds of years with the help of governments and trade associations which should have known better.

Perhaps of equal interest to us are the paths taken by the two men, Home and Black. Both men were students at Edinburgh at about the same time and both later served on the medical faculty for many years. Both did important work on alkalies. Yet their paths crossed only for a short but noteworthy time — in this Dublin volume.

Francis Home was born on the 17th of November, 1719, at Eccles, Berwickshire, Scotland. From 1742 to 1748 he served as surgeon of dragoons in Flanders in the "seven years" war. During various intervals of the campaign he studied at the University in Leyden. After leaving the army he studied at Edinburgh and received his MD in 1750. His inaugural thesis for the MD degree was a treatise on intermittent fever. Home practiced for some years in Edinburgh and was made a fellow of the Edinburgh College of Physicians. In 1756 his important work on "Experiments in Bleaching" was published, and in 1757 he was given a gold medal by the Edinburgh Society for the Improvement of Arts and Manufactures for an essay on the "Principles of Agriculture." In 1768 Home was made the first professor of materia medica at the University of Edinburgh, at which time the subject was disassociated from botany. He held this chair until 1798 and also acted as one of the clinical professors of medicine at the infirmary. At the infirmary Home experimented with several new drugs, which he introduced into practice. He was the first to call attention to croup as a distinct disease, and his valuable work "Principia Medicina" was used as a textbook by several professors of medicine on the continent. Home died on the 15th of February, 1813, at the age of 93 *(1)*.

Figure 1
Joseph Black

Joseph Black was born in France in 1728. His father was of Scotch extraction and a citizen of Belfast engaged in the wine business in Bordeaux. At the age of 12 Black was sent to Belfast to begin his elementary studies. In 1746 he was sent to the University of Glasgow where he studied languages, philosophy, and then, having chosen medicine as a profession, he attended lectures in anatomy and also lectures of Dr Cullen, who at that time was professor of medicine at Glasgow. Cullen had begun to give lectures on chemistry and Black acted as his assistant in the laboratory and developed a close friendship with him.

After three years work with Dr Cullen, Black went to Edinburgh to finish his education in medicine. In the summer of 1754 he was awarded the degree of doctor of medicine and his monumental "De Humore Acido a Cibis orto, et Magnesia Alba," was printed as his inaugural dissertation.

From 1754 to 1756 Black practiced medicine in Edinburgh. In 1756 he was appointed to the chair of medicine and lectureship in chemistry at Glasgow in place of Dr Cullen, who was assuming the chair of chemistry in Edinburgh. While at Glasgow Black practiced medicine in addition to filling his chairs at the University. It was during his residence at Glasgow that his opinions and ideas concerning heat were developed and expounded *(2)*.

In 1766 Dr Cullen was transferred to the chair of "Institutes of Medicine" and the chemical chair at Edinburgh was offered to Black. Black took the post and held it until his death on November 10, 1799, in his 71st year. During Black's time at Edinburgh he occasionally practiced medicine and occasionally examined various problems concerned with the chemical industry. According to Thomson, "Dr Black's writings are exceedingly few, consisting altogether of no more than three papers." The first, entitled "Experiments upon Magnesia Alba, Quick-

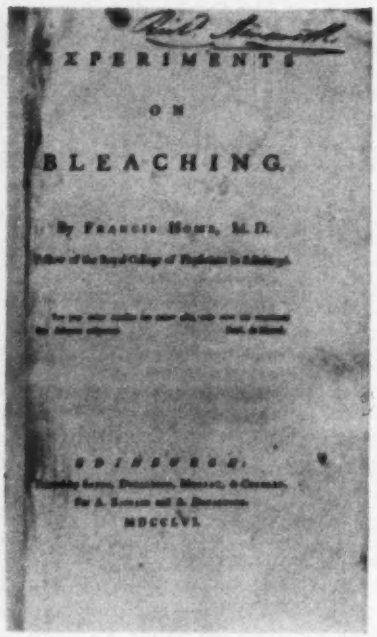
lime and other Alkaline Substances," constituted the subject of his inaugural dissertation. It afterwards appeared in an English dress in one of the volumes of the Edinburgh Physical Literary essays in the year 1755. Mr Creech, the bookseller, published it in a separate pamphlet together with Dr Cullen's essay on the "Cold Produced by Evaporating Fluids" in the year 1796. This essay exhibits one of the very first examples of inductive reasoning to be found in the English language. Dr Black's second paper was published in the Philosophical Transaction for 1775 and was entitled "The Supposed Effect of Boiling on Water, in Disposing it to Freeze more Readily, Ascertained by Experiments." According to Thomson, Black's last paper was, "An Analysis of the Water of Some Boiling Springs in Iceland" *(3)*. Neither Thomson nor Ramsey make any mention of the paper by Black on "The Effect of Lime upon Alkaline Salts," appended to the Dublin edition of Home's work on bleaching.

The paths of Black and Home should have crossed many times. Both men did important work on alkalies in Edinburgh at approximately the same time although from different aspects. Both men were physicians. Both men practiced in Edinburgh. Black was made professor of chemistry at Edinburgh in 1766 and Home, professor of materia medica in 1768. Black resided at Edinburgh as professor until 1797, and Home, until 1798. Nevertheless, there is no mention of any communication or intercourse between the two men as far as Black's and Home's biographers are concerned. The only apparent connection is the publication of papers of both men in the aforementioned book on bleaching.

DISCUSSION

From the earliest times bleached linen fabrics were held in high regard. In medieval times a bleaching industry became firmly established in The Netherlands and in North Germany. The fine linens of Flanders and Silicia have enjoyed a universal reputation almost until modern times. While the manufacture of linen had increased in the British Isles from the 16th century on until modern times, it was not until the first quarter of the 18th century that the bleaching of linens in the British Isles began to reach importance. Even at this time, linens of British manufacture were often sent to The Netherlands to be bleached and then returned. For the most part, the English bleachers copied or followed the Dutch bleaching method, which was a slow and tedious process *(4)*.

A typical bleaching process at the time that Home began his study of bleaching was as follows:


EXPERIMENTS

ON

BLEACHING.

By FRANCIS HOME, M. D.

EDINBURGH:

MDCCLVI.

Figure 2
Title page of first edition of Home's work on bleaching

First, the linen was steeped and allowed to ferment for 36 to 48 hours in water containing a little bran or rye meal or lye. The fabrics were then 'bucked'; that is to say, gradually heated for a number of hours in an alkali solution. This alkali solution was prepared by making up a mother lye in 170 gallons (30 pounds of blue ashes, 30 pounds of white pearl ashes, 200 pounds of marcost ashes or 300 pounds of cashub ashes, and 300 pounds of muscovy ashes) and then adding two gallons of it along with two pounds of soap in 40 gallons of the bucking liquor.

After the bucking operation, the cloth would be exposed to the sun and air and watered for six hours and then exposed for several days more. The linen would then be bucked again and exposed again. This alternate operation of bucking and exposing to air would be carried on 10 to 15 times. The goods would finally be soured in buttermilk, scrubbed with soap, and then, if the whiteness was not good enough, the whole process would be repeated.

The Irish method was essentially the same as the Dutch process but the goods would be boiled more vigorously and some differences in the amounts and types of alkali would be used *(5)*.

At the beginning of the 18th century, bleaching was at best an art. No attempt had ever been made before the time of Home to apply chemical or scientific knowledge to the bleaching industry.

While laws were passed from time to time in England to control the bleaching industry, with the idea of preserving the quality of British workmanship and reputation, some of these laws were based on completely wrong ideas.

Undoubtedly, the most foolish of these laws was the prohibition of the use of lime in combination with ashes (carbonates) in the bleaching of linen. The law in itself had some basis in fact because lime, that is, calcium hydroxide, used alone on linen would harm the strength and appearance of the fabrics even though bleaching was speeded up. The property of lime on admixture with sodium and potassium carbonates to form sodium and potassium hydroxides and inert calcium carbonate was completely misunderstood.

In the early part of the 18th century an additional law prohibiting the use of lime in bleaching was passed by an act of Parliament with the prohibition in the words. . . . "Lappers may enter into buck houses, bleachyards and other places and search the same for lime, pigeon's dung, soap dregs, and upon proof before one or more justices of the peace that any of the above materials had been mixed or used with any lees in bleaching, the offender shall pay 5 pounds sterling (and the cloth so bleached) to the informer, and also be rendered incapable of bleaching for two years following." The law was made even more vigorous in Ireland . . . "That bleacher who used improper materials was to be adjudged guilty of felony and to suffer death" *(4)*.

It is interesting to note that, through ignorance, lime was being used in the bleaching processes during all this time for the muscovy ashes, and similar alkaline materials, which had to be mixed with potashes for satisfactory results, actually consisted of a mixture of lime and potassium hydroxide.

Home was undoubtedly the first person to point out the importance of chemical knowledge in improving the bleaching process. In 1756 the results of his researches on bleaching were published in Edinburgh "In Consequence of a Petition Presented by the Bleachers to the Honorable Board of Trustees."

In the preface to this work Home makes these salient points: "I know no trade which is so entirely the object of chymistry as bleaching, and none that has been so little considered in that light." "I find the most skillful bleachers understand the general theory of their art tolerably well; but being ignorant of the principles of chymistry, cannot make proper use of this theory or apply their knowledge to the advancement of their art." "But what the bleachers are most deficient in, is a knowledge of the nature and properties of those alkaline salts, or ashes, as they call them, which they make use of. Experience has taught them that these salts are to be used in different proportions; but nothing less than a chymical inquiry can disclose their hidden nature. If this point was once ascer-

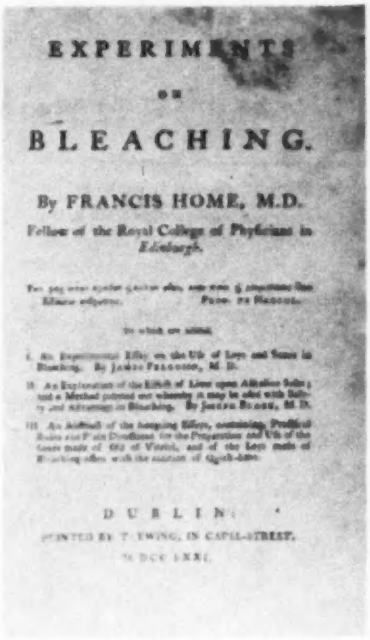
tained, the theory of bleaching would rest on a more certain foundation than at present. For what certain theory can be established with regard to the operation of these ashes, when we know not what those ashes are." Home's attempt to remove this latter deficiency was his great contribution to the bleaching industry and to a certain extent, a great contribution to industrial chemistry *(5)*.

Home analyzed the various alkaline salts used in bleaching. He examined the pearl ash and blue ash (crude potassium carbonate) and showed that these alkaline salts contained no lime. He developed a method for measuring their strength by neutralizing with measured amounts of acids.

He showed that the muscovy salts were greatly different from pearl ash and blue ash and that the muscovy salts contained an alkaline salt (potassium hydroxide) and lime. He also indicated the nature of the other alkaline salts and developed methods so that the bleacher could ascertain their strength.

Home pointed out that it was foolish to pay the high price for muscovy ashes, as they could be prepared by mixing pearl ashes with quicklime. He showed that lime reduced the strength of linen when used alone during bleaching, but speeded up the results. He showed, however, that when pearl ashes were mixed with quicklime (calcium hydroxide), not only was the bleaching action speeded up, but there was no diminution of the strength of the linen. Home even had this mixture of lime and pearl ash tried in the bleach fields with very satisfactory results. He showed that the use of muscovy ashes alone for bleaching gave excellent whiteness but reduced the strength. He then showed the reason for the various bleaching formulas containing not only the muscovy ashes but always a certain amount of pearl or similar ashes. In other words, the bleachers had learned by experience the need for having potassium or sodium hydroxide in solution for maximum bleaching effects and a necessity for an excess of sodium or potassium carbonate over the lime in order to make sure that no soluble lime salts would be present in solution, but they really did not know what they were using. Home worked out empirically the amount of various alkaline salts (carbonates) which should be added to definite quantities of lime in order to remove any corroding power from the lime and at the same time keep the whitening power of the mixture up *(5)*.

In a list of Home's correlaries or instructions to the bleacher, correlary 8 is of particular interest. "Alkaline salts added to lime, diminish its power of weakening and corroding cloth; and that in proportion to the quantity of these salts added to the lime . . . so that I



EXPERIMENTS

ON

BLEACHING.

By FRANCIS HOME, M.D.

Fellow of the Royal College of Physicians in *Edinburgh*.

DUBLIN:

PRINTED BY T. EWING, IN CAPEL-STREET.

Figure 3

Title page of the 1771 edition of Home's work containing Black's paper on the effect of lime upon alkaline salts

imagine they might be used with safety, in the proportion of one part of lime to four of pure alkaline salts, to bleach cloth. This fully accounts for an observation made by all bleachers, that the bleaching salts when mixed together operate safer and better than when used separately." Home finally says, "I have been assured, that in whitening yarn at Manchester there is always a fourth part of lime added to the salts. I have discovered that it is used in the same way in this country. I know no objection to it but that of its being against the law" *(5)*.

Thus Home had a real insight into the nature of the alkalies. He undoubtedly understood the difference between sodium and potassium carbonate and sodium and potassium hydroxide. He also realized that mixing potassium carbonate or sodium carbonate with calcium hydroxide precipitated out the lime as calcium carbonate, leaving the sodium or potassium hydroxide. The one point that he did not realize was that the acidic material combined with the sodium or potassium in the carbonate was really the gas, carbon dioxide. It remained for Black's work to give an unquestioned theoretical basis for the practical discoveries of Home.

Joseph Black's monumental work on the nature of magnesia alba and quicklime is too well known to give more than a brief summary at this time. According to Black's biographer, "It was with the object of discovering a milder alkali and bringing it into the service of medicine that Black began his experiments on magnesia" *(2)*.

Black's work began in 1752 and resulted in his thesis for the MD degree at Edinburgh. According to Thomson, Black held the belief, which was common among most chemists, that the causticity of quicklime was due to some igneous matter that it imbibed from fire. Alkaline salts were thus made caustic by acquiring some igneous matter from quicklime. Black's experiments, however, completely cleared up the whole mystery. Black clearly showed that the formation of quicklime from limestone by heat was due to the driving off of a gas (carbon dioxide), thus removing an acidic material from the lime. He pointed out that this same gas could be driven off from limestone by treatment with acid, and by accurate weighing he showed that the same amount of gas was lost from limestone whether it was treated with heat or with acid. Black further showed that when alkaline salts (sodium or potassium carbonate) in solution were treated with quicklime, the lime withdrew the carbon dioxide which was combined in the alkaline salts to form ordinary chalk. He showed that the caustic alkalies were simply the alkaline salts deprived of the combined acidic gas (carbon dioxide). Black's work was undoubtedly a masterpiece of reasoning and chemical experimentation equal to any work of modern times *(6)*.

We are all familiar with the great effect of Black's work on chemical theory, in general, but we have neglected to note the quick effect it had on explaining various contemporary chemical processes and particularly in assisting in over-throwing some of the crude ideas and ridiculous laws concerning the bleaching industry.

Black himself was not active in controversy or in trying to extend the influence of his own work. It remained for others to realize the importance of Black's discoveries and to broadcast them to industry and to the scientists of the day.

Black apparently did have some perception of the importance of his discoveries for the bleaching industry although we have little to go on other than the paper which was appended to the Dublin edition of Home's work and references to one or two letters concerning the subject which Black's biographer, Ramsey, had noted. On page 36 of Ramsey's 'Life and Letters of Joseph Black' there appears part of a letter which Black had written to his Father dated Glasgow, 20th September, 1763, to wit: "I have at last wrote a paper upon the use of lime in bleaching which I transmitted some parts ago to Mr Ferguson and shall do anything further that is in my power. I see at the foot of your letter to James Burnett you mention a memorial from the linen manufacturers which at their desire you had sent me. I received the letter you enclosed to me from Mr Ferguson in April last,

but have not seen anything else upon the subject: this I take notice of only to ask if you transmitted any other memorial. You likewise mention a considerably grateful reward promised by the commissioners of the linen board. I should be glad entre nous to know the particulars of this for I never heard of any reward before, nor ever expected it." Ramsey also makes mention of another letter in September, 1763, in which Black wrote to his Father saying that he "had written a paper on the use of lime in bleaching" *(2)*. This is undoubtedly then the paper which was appended to Home's work.

We have no record of Black receiving any prize for his paper but we do know that Ferguson himself received a sum from the linen board for his work on alkalies. Apparently, Ferguson was the one who really promoted the practical work of Home and showed how it could be explained and given a solid theoretical basis by the discoveries of Black.

Now, to the volume of our particular interest. The title page of this volume reads 'Experiments on Bleaching by Francis Home, MD' to which are added 1) an experimental essay on the use of leys and sours in bleaching by James Ferguson, MD; 2) an explanation of the effect of lime upon alkaline salts; and a method pointed whereby it may be used with safety and advantage in bleaching by Joseph Black, MD; 3) an abstract of the foregoing essays containing practical rules and plain directions for the preparation and use of the sours made of oil of vitrol, and of the leys made of bleaching ashes with the addition of quicklime: Dublin, 1771 *(7)*.

The section by Home is word for word the same as the 1756 Edinburgh edition of Home's work. Its contents already have been discussed.

The paper by Ferguson has a dedication to the trustees of the linen manufacture and is dated Belfast, January 1st, 1766. In the preface Ferguson clearly points out the importance of Black's work in the following words. "The doctrine of fixed air, not long since introduced hath opened a large field for improvements of natural knowledge: by it Dr Black has explained the nature of lime in a new and satisfactory manner. By it Dr McBride has thrown light on some important subjects in philosophy and medicine: and by it the author's intention is to set the properties of alkaline salts in a new point of view, whereby he hopes to make some advances in the improvement of the art of bleaching."

Ferguson, in a sense, simply combines the results of Home's work with the theoretical work of Black and re-applies this information to the bleaching industry. He points out many experiments which show how ashes (bleaching alkalies) may

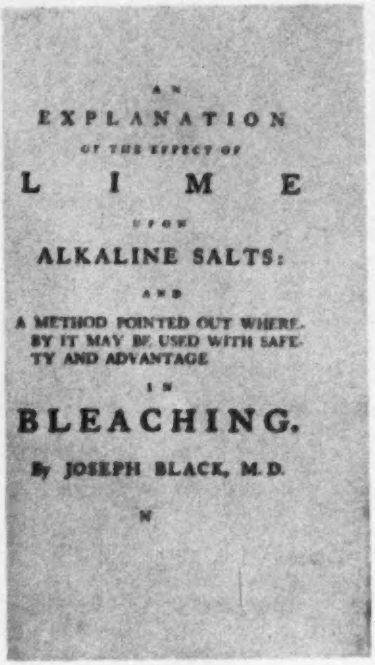

AN
EXPLANATION
OF THE EFFECT OF
LIME
UPON
ALKALINE SALTS:
AND
A METHOD POINTED OUT WHERE-BY IT MAY BE USED WITH SAFE-TY AND ADVANTAGE
IN
BLEACHING.
By JOSEPH BLACK, M.D.

Figure 4
Title page of Black's paper on the effect of lime upon alkaline salts

be given full strength by the addition of lime and shows a test method for adding just the right amount. Furthermore, Ferguson repeated the work of Home and discusses the results of bleaching a number of pieces of linen with the ley made by the addition of quicklime to ashes (potassium carbonate). These bleached fabrics were submitted by Ferguson to the linen board for their examination. Speaking of the improved bleaching action obtained by the addition of some lime to the ashes (sodium or potassium carbonate) Ferguson says "If then leys free from fixed air be most effectual in bleaching, does not the advantage appear of mixing so much lime with our ashes as is sufficient to attract the whole of their fixed air, and thus to bring them to their highest degree of perfection." Ferguson's paper was directed towards the repeal of the law prohibiting the use of lime in bleaching and at the same time, of course, Ferguson was hoping to obtain a reward for putting forward the works of Home and Black in their proper light.

The little paper by Black on the use of lime in bleaching is clear, simple and irrefutable. The whole argument is summed up in the first paragraph of Black's paper . . . "Whatever foundation there may be for distrusting and avoiding the use of lime in bleaching, as employed alone, there should be no reason for entertaining any prejudice against a ley drawn from a proper mixture of lime and bleaching ashes, as it is now most certain and incontestable that a ley of this kind does not contain the smallest particle of the lime."

Black then proceeds to show how on addition of an excess of pearl ash to lime water, the lime is completely precipitated as an innocuous chalk. He shows experimentally that the ley drawn from a proper mixture of lime and ash contains no dissolved lime. Black discusses the theory behind this reaction and explains how the lime has taken the fixed air from the potash. He points out that the alkaline salts (potassium and sodium carbonates), being deprived of their combined fixed air become more active, penetrating and powerful than before.

Black discusses the various kinds of ashes used in bleaching and points out that those which are considered most useful are only those that contain "a salt that is most free from the above mentioned aerial matter." He shows that the high bleaching strength of the Russian ashes is due to the fact that these ashes contain a high content of the alkaline salts free of their fixed air (in other words, potassium or sodium hydroxide).

He points out that the use of lime is the only practical way to free the alkaline salts of their fixed air, and he shows how to balance in a practical manner the amount of ash used with the lime *(7)*.

CONCLUSION

In conclusion, we may say that the work of Home and the work of Black gave the first scientific basis for improvements in the bleaching process. In spite of their clearcut and logical presentations, however, the legal proscriptions against the proper use of lime in bleaching were not immediately removed. Nevertheless, the bleaching industry could not resist such sound ideas and in spite of the laws, the industry began the use of lime in conjunction with ashes to form sodium and potassium hydroxide for bleaching. Finally the laws proscribing the use of lime in bleaching were appealed. They could not stand up under the overwhelming weight of logic, science and practicality.

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AATCC CALENDAR

COUNCIL
Nov 18, Jan 20 (Hotel Statler, New York, N Y); April 20; June 15; Sept, 1956; Nov 16, 1956; Jan 18, 1957.

NATIONAL CONVENTIONS
1956 (Waldorf-Astoria, New York); 1957 (Boston); 1958 (Chicago); (Washington, DC)

MID-WEST SECTION
Oct 29 (Bismarck Hotel, Chicago, Ill).

NEW YORK SECTION
Oct 14, Nov 18 (Kohler's Swiss Chalet, Rochelle Park, N J); Jan 27, Feb 24 (Hotel Delmonico, New York, N Y); Mar 23, Apr 27, May 18 (Kohler's Swiss Chalet, Rochelle Park, N J).

NIAGARA FRONTIER SECTION
Oct 14 (joint meeting with Ontario Section, CATCC); Dec 2, Jan 20 (U S); Mar 3 (Canada—meeting to be held in conjunction with Ontario Section, CATCC); Apr 27 (U S).

NORTHERN NEW ENGLAND SECTION
Oct 14; Dec 9.

PACIFIC SOUTHWEST SECTION
Oct 7, Feb 6 (Gourmet Restaurant, Beverly Hills, Calif); Dec 2.

PHILADELPHIA SECTION
Oct 21 (Penn-Sherwood Hotel); Dec 2, Jan 13 (Kugler's Restaurant).

PIEDMONT SECTION
Oct 29 (Hotel Wm R Barringer, Charlotte, N C).

RHODE ISLAND SECTION
Oct 13, Dec 1 (Johnson's Hummocks, Providence).

SOUTH CENTRAL SECTION
Dec 10 (Hotel Patten, Chattanooga, Tenn).

SOUTHEASTERN SECTION
Dec 3 (Atlanta Biltmore, Atlanta, Ga).

WASHINGTON SECTION
Oct 7 (National Institute of Drycleaning, Silver Spring, Md)

WESTERN NEW ENGLAND SECTION
Nov 4 (Hartford, Conn); Dec 16 (Rapp's Restaurant, Shelton, Conn)

ACTIVITIES OF THE LOCAL SECTIONS

NIAGARA FRONTIER — On Friday, August 19th, a meeting of the officers of the Niagara Frontier Section was held in the Conference Room of the Research Building of National Aniline Division, Allied Chemical & Dye Corp, Buffalo, N Y.

A tentative schedule of meetings for the coming season was drawn up as follows: Oct 14 — joint meeting with the Ontario Section of CATCC; Dec 2 and Jan 20 — to be held in U S; Mar 3 — to be held in Canada in conjunction with the Ontario Section of CATCC; Apr 27 — to be held in U S.

New officers and sectional committeemen will be announced at the October meeting after election by mail.

Harry Peers has been named chairman of the Auditing Committee and Salvatore Puliafico, co-chairman of the Intersectional Contest Committee.

* * * * *

PIEDMONT — The Piedmont Section will hold its annual meeting at the Wm Barringer Hotel, Charlotte, N C, on October 29, 1955.

Registration will commence in the Terrace Room at 10:00 am, and Sectional Officers will hold their annual luncheon and business meeting in the Town Room at 12:30 pm.

The technical meeting will be held at 2:30 pm in the Terrace Room with Neal Truslow, U S Rubber Co, presiding. It will be given over to a discussion of properties and methods of processing some of the newer synthetic fibers. S J Davis, Chemstrand Corp, will discuss Acrilan; A F Tesi, Celanese Corp of America, will discuss Arnel; and R N Stribling, American Enka Corp, will talk on Nylenca.

A social hour at 6:00 pm will be followed by the annual banquet at 7:00 pm. Featured speaker will be W E Clark, vice president, U S Rubber Co.

The following officers will be installed for the year 1955-6: *Chairman* — Clarence Hooper, Burlington Industries; *Vice Chairman* — Clement O Stevenson, Ciba Co, Inc; *Secretary* — Warren E Rixon, Carbide & Carbon Chemicals Co; *Treasurer* — J C King, Fairforest Finishing Co; *Custodian* — Arthur R Thompson, Ciba Co, Inc; *Councilors* — Herman J Jordan, Jr, Piedmont Processing Co; Francis K Burr, Fabric Research Laboratories, Inc; *Sectional Committeemen* — Edward A Murray, textile consultant; James Balloch, Jr, Jacques Wolf & Co; Kenneth S Campbell, School of Textiles, North Carolina State College; V B Holland, Cannon Mills Co.

Herman J Jordan, Jr, retiring chairman, will preside at the annual banquet, at which Samuel L Hayes, Piedmont Section chairman in 1930, will receive a silver anniversary tray. It has been the custom of the Section to present such a tray to past chairmen as they reach the 25th anniversary of said chairmanship. Mr Jordan will be presented with the past-chairman's plaque in appropriate ceremonies.

The first recipients of the Charles H Stone Scholarship Fund will be presented They are: William M Barnette, Jr, N C State College, and Bobby R Clement, Clemson College.

A program of entertainment will conclude the program.

SPECIAL NOTICE

THE AATCC Subject and Speakers Bureau, a newly formed committee under the chairmanship of Matthew J Babey, has been set up to organize and maintain a file of available subjects and speakers. These subjects will be of the general as well as technical type. It is hoped that this type of reference file will be of help to the locals sections of AATCC as well as other organizations and societies in need of speakers.

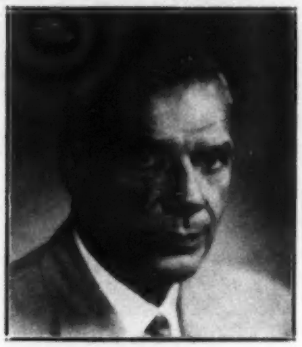
The Committee is seeking the following:

1) The names of speakers or organizations desiring to make available for presentation original papers which have not been presented previously.
2) The names of speakers or organizations which would present on request papers which had been presented previously, but which would be of interest to new audiences.
3) Suggestions of subjects which would be of interest. (It would then be the Committee's function to seek out appropriate speakers).
4) The names of qualified speakers who might be approached to prepare papers on suggested topics.

The function of this new Committee will be TO PROVIDE A SERVICE. It will in no way conflict with the functions of the various local section program chairmen or the Technical Program Committee of AATCC.

It is requested that interested parties write to Mr Babey at American Cyanamid Co, Dyestuff Dept, Bound Brook, N J, giving all pertinent information where possible, eg, Subject, Name of Speaker and his Home or Company Address, Approximate Length of Talk, Dates Presented and Where, and an Abstract.

ADR AWARD TO HENRY E MILLSON



Henry E Millson

THE presentation of the fifth AMERICAN DYESTUFF REPORTER Award was made to Henry E Millson, American Cyanamid Company, at the Annual Banquet of the 1955 Convention at Chalfonte-Haddon Hall, Atlantic City on September 24th. The Award, presented by Prof Percival Theel, Chairman of the AATCC Publications Committee, was for Mr Millson's paper "The Microdyeoscope: Microscopical Observations on Dyeing" which was published in the June 20th, 1955 issue of the REPORTER. This paper had been presented before the following sections: New York, January 11, 1952; Southeastern, February 23, 1952; Mid-West, October 4, 1952; Philadelphia, October 23, 1953; and Rhode Island, January 28, 1954. In addition to the cash award, a commemorative plaque, provided by the REPORTER, was also presented to Mr Millson.

Mr Millson was born and educated in Philadelphia. He joined Calco in March of 1937 and at present is manager of the Dyestuff Technical Service Laboratories, Organic Chemicals Division, American Cyanamid Company. Mr Millson is the author and co-author of over 40 technical papers on dyeing and related subjects, fluorescence and phosphorescence. He has many patents in the fields of dyeing and fluorescence and is the co-inventor of the Perpirometer and the Microdyeoscope.

The Award was endowed by the Howes Publishing Company as a memorial to Alfred P Howes, founder of the AMERICAN DYESTUFF REPORTER. Its purpose is to encourage the presentation of the best possible papers before local and national meetings of the Association. The Award, $200 annually, is presented to the author or authors of the paper considered best in the opinion of the judges. Any technical paper presented before a local or national meeting of the AATCC and published in the *Proceedings* as they appear in the AMERICAN DYESTUFF REPORTER is eligible with the following exceptions: Intersectional Contest papers, papers by employees of the AATCC, reports of work substantially subsidized by AATCC, or reports of research committees. It is a condition of eligibility that the paper have its first publication in the *Proceedings*. Papers published in the *Proceedings* from July 1st of one year to June 30th of the next year are considered in each judging period.

Judges for this year's contest were Alfred R Macormac, Agricultural Research Center, *Chairman*, James D Dean, retired, and Robert W Joerger, Franklin Process Co.

Details on previous Award winners appeared in the August 29th issue.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

55-14

Education: M Sc, textile technology; BS, mechanical engg.

Experience: Textile engineer, cotton printing and finishing; research asst evaluating mechanical properties of fibers.

Age: 28; married; will be discharged from Navy in Dec, position in product development desired, anywhere in the U S.

9-12, 9-26

55-15

Education: BS, textile chemistry & dyeing; additional courses in business management.

Experience: U S Navy, lt j g, executive officer.

Age: 26; married; references, technical sales position desired.

9-12, 9-26

55-16

Education: BS, chemistry, with further courses in textiles.

Experience: textile chemist, supervisory and research.

Age: 43; married; references; position in vicinity of New York City desired.

9-12, 9-26

55-17

Education: BS, chemistry.

Experience: plant chemist, control and development; supervision of dyehouse, wool, cotton and synthetics, piece and stock, screen printing.

Age: 28; married; veteran; references, upstate New York preferred.

9-26, 10-10

55-18

Education: PhD, chemistry and textile technology.

Experience: research and teaching.

Woman, age 34; single; references; position in research and development desired, northeastern U S.

9-26, 10-10

Your Candidates —

RAYMOND W JACOBY

JOSEPH H JONES

ERNEST R KASWELL

WALTER M SCOTT

FREDERICK V TRAUT

HENRY L YOUNG

Raymond W Jacoby

Candidate for Reelection as President

Business Career—From 1910 to 1937 served in the textile finishing industry in various capacities from plant chemist to plant manager. Since 1937 with Ciba Company, Inc as technician, research director, branch manager, and presently as consultant. Presented papers before most of AATCC sections and all of CATCC sections. Lectured on textiles at numerous schools, colleges, professional, business and lay organizations. Holder of several American, British and Canadian patents on textile processing and equipment. Contributed articles to several trade publications.

AATCC Activities—Mr Jacoby has served or is serving as follows: Member of Colour Index Steering, Editing and Marketing Committees; Member of Small Color Differences, Publications, Convention and Technical Program Committees; Chairman of Rhode Island Section Research Advisory Committee; Member of E C R and T C R; Chairman of Board of Editors AATCC Monograph #2 "The Application of Vat Dyes"; Chairman of Rhode Island Section and National Councilor from that Section; Assistant General Chairman of the 1950 Convention; Vice President; Chairman of the Executive Committee for the 1956 Perkin Centennial; served on many Rhode Island Section Intersectional Contest Committees and presented three of the papers at the annual conventions; 1951 Olney Medalist; President in 1955.

Joseph H Jones

Candidate for Reelection as Vice President, Western Region

Business Career—Entire business career with Phoenix Dye Works; currently General Superintendent.

AATCC Activities—Mr Jones has served or is serving as follows: Treasurer, Vice Chairman, and Chairman, Mid-West Section; Councilor representing Mid-West Section; Vice President; Member, Convention Committee; Member, Publications Committee; Member, Intersectional Contest Committee, Mid-West Section; Vice Chairman, Executive Committee, and Chairman, Hotel Reservations, 1953 Convention Committee; Chairman, Finance, 1947 Convention Committee.

Ernest R Kaswell

Candidate for Election as Vice President, New England Region

Business Career—Staff Member of the Textile Division of M I T; Research Chemist, American Cyanamid Co; founded Fabric Research Laboratories, Inc in 1942 together with Walter J Hamburger and Kenneth R Fox and is currently President of this organization. Has written numerous scientific articles in the textile technology field and is the author of an authoritative reference book "Textile Fibers, Yarns and Fabrics."

AATCC Activities—Mr Kaswell has served or is serving as follows: Chairman of Northern New England Section; Councilor representing Northern New England Section; Chairman of the 1957 AATCC National Convention.

Walter M Scott

Candidate for Reelection as Vice President, Southern Region

Business Career—Chief Chemist, Cheney Brothers; Technical Advisor to the Sales Dept, National Aniline & Chemical Co; Service Director, Munsell Color Co; Service Director, Gustavus J Esselen, Inc; Chief, Cotton Chemical Finishing Division, Southern Regional Research Laboratory, USDA; Colonel, U S Army Chemical Warfare Service; Director, Southern Regional Research Laboratory, USDA; Assistant Chief, Bureau of Agricultural and Industrial Chemistry; currently, Assistant Director, Utilization Research, Agricultural Research Service, USDA. Dr Scott is the author of numerous scientific publications, has been granted several patents, and has spoken before many groups.

Frederick V Traut

Candidate for Election as Vice President, Middle Atlantic Region

Business Career — Laboratory Assistant, U S Testing Co; Chemist, Sales Representative, Assistant to Plant Superintendent, and currently Superintendent of Processing at Globe Dye Works Co.

AATCC Activities — Mr Traut has served or is serving as follows: Chairman, Dining Committee, Philadelphia Section; Member, Sectional Committee, Philadelphia Section; Councilor representing Philadelphia Section; Treasurer, Vice Chairman and Chairman, Philadelphia Section; Chairman of 1955 National Convention; Member of National Convention Committee; Member of Philadelphia Section Intersectional Contest Committee.

AATCC Activities — Dr Scott has served or is serving as follows: Member of General Organization Committee for Inaugural Meeting; Councilor, Councilor-at-Large, and Councilor representing Northern New England, Southeastern and Washington Sections; Vice President; Member of the T C R and E C R; Chairman of the Committees on Colorfastness of Silk Textiles, Analytical Methods for a Textile Laboratory, and Color; Official Representative on the Inter-Society Color Council.

Henry L Young

Candidate for Election as Vice President, Middle Atlantic Region

Business Career — Chemist for New Jersey Zinc Co and General Electric Co; Sales Engineer for the Bristol Co; Market Research Director for McGraw-Hill Co; Divisional Vice President, Textile Colors Division, Interchemical Corp; currently Member of the General Staff, Interchemical Corp. He is the author of several articles appearing in technical publications.

AATCC Activities — Mr Young has served or is serving as follows: Chairman, New York Section Corporate Membership Committee; Chairman, Exhibits Committee, 1951 National Convention; Councilor representing New York Section; Member of T C R; Member of Committee on Fastness to Washing; Chairman, Special Committee on Standardization of Accelerated Weathering Tests; Member of Corporate Membership Committee; Member and Chairman of Committee on New Personnel; Chairman of Exhibits Committee, 1956 Perkin Centennial.

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IMPORTANT NOTICE

To all manufacturers of Textile Chemical Specialties:

The American Association of Textile Chemists and Colorists is now collecting material for the 1956 Edition of the Technical Manual and Year Book, and solicits your cooperation.

Please note that the list of textile chemical specialties will be completely revised and brought up to date as in past years. All manufacturers and importers of textile chemical specialty products are therefore invited to submit data for the 1956 Edition, covering the following items only:

New data not previously listed
Correction of errors
Deletion of obsolete products

Cards should be filled out strictly in accordance with the directions accompanying this notice, and following the style of presentation employed in the 1955 edition. To meet editorial schedules, all cards must be received by the undersigned before December 1, 1955.

WILLIAM H CADY, editor, Technical Manual and Year Book
127 Power Street, Providence 6, Rhode Island

DIRECTIONS FOR FILLING OUT CARDS

In the compilation of this list of American sources of textile chemical specialties, products are selected primarily for their specific usefulness in textile processing, with the idea of presenting such information for the benefit of the textile chemist and colorist. However, because some textile chemicals, such as surface-active agents, are employed in other industries, nontextile uses are permitted to be indicated.

The reader should bear in mind that information from firms concerning uses and compositions is repeated without investigation and thus cannot be vouched for by the AATCC. On the other hand, because listings are made without charge for the benefit of our membership, it is nevertheless possible to edit all listings carefully and especially to eliminate exaggerated claims.

Information for new products should be tabulated on cards as described on the opposite page. Where it is desired to make corrections in old entries in either the Index or the Alphabetical List, or to make deletions of old entries for withdrawn products from both of these, new cards should be prepared in the same manner, appropriately marked for correction or deletion, as described in the directions. Do not prepare cards for products already properly indexed and listed. Please note that we do not furnish printed forms; ordinary white ruled 3" x 5" index cards should be used.

Full instructions for preparing the cards are given on the enclosed sheet, and examples of cards properly filled out are shown. In making out the cards it is necessary that you follow the instructions carefully; otherwise they may be returned for improvement. In particular, please avoid the use of capitals except for initial letters; be sure to report all products which have been discontinued; and please see that the "Chemical Nature" is properly recorded. We do not ask you to reveal secret information, but such descriptions as "amine compound" or "organic salt" are not considered adequate.

I. KEY

ABCDE

ABCDE Chemical Co

24 South Main St

Deep River, Conn

(a) On first line: firm abbreviation, limited to not over five letters.

(b) On third line: firm name

(c) On fourth and fifth lines: firm address

NOTE: Only one Key Card is necessary from each manufacturer

II. INDEX

Bleaching Agents

Ableachor ABCDE

New index Entry

(a) On first line: enter one of the headings taken from the Index in previous editions, indicating an important use for the product being reported. If it has several uses, make out a separate card for each.

(b) On third line, toward left: list the name of the product (only one) without any descriptive letters or numbers.

(c) On third line, near right margin: list the abbreviation of the firm name, taken from the Key.

(d) On bottom line: indicate whether the card is a New, Corrected, or Deleted Index Entry.

III. ALPHABETICAL LIST

ABCDE

Ableachor* CWS

Bleaching of all fibers

H_2O_2

New List Entry

(a) On first line: abbreviation of firm name.

(b) On third line: complete proprietary name of product, with descriptive letters or numbers; if name of product is a registered trade-mark, indicate the fact by an asterisk following the registered part of the name.

(c) On fifth line: various uses.

(d) On eighth line: chemical nature, adequately given.

(e) On tenth line: patent number, if product is patented.

(f) On bottom line: indicate whether the card is a New, Corrected, or Deleted List Entry.

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(September Elections)

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Rhode Island Section——

PROCEEDINGS OF THE RHODE ISLAND SECTION'S 1955 STUDENTS NIGHT MEETING*

Speakers for the Rhode Island Section's 1955 Students Night meeting included Arthur F McLean, Glenlyon Print Works, chairman of the Rhode Island Section; Elliot Broadbent, Glenlyon Print Works; and Raymond W Jacoby, Ciba Co, Inc, AATCC president.

The remarks of each are included in order of presentation.

ARTHUR F McLEAN: Good evening gentlemen. I can't tell you how pleased I am to see so many of you here. As you know, this was an experiment. We have had students' nights in the past, but this time we felt that we would like to bring together students from all the textile schools within the Rhode Island area so that they would have an opportunity to meet each other as well as members of our Section. We are planning the same type of meeting for next year, possibly in Providence.

We hope that you students eventually will run these meetings, for we feel that it would be a good opportunity for you to get a little experience. Certainly we are going to turn many of these jobs in the organization over to you when you get out in the field.

I should like at this time to introduce to you those at the head table: Ernest Chornyei, past chairman of the Section and presently a councilor; Tom Larson, a councilor; Bill Timperley, our treasurer; Jim Shore, chairman of this particular meeting; Ray Caroselli, vice chairman; Dr Browning, vice president of the University of Rhode Island and dean of Arts and Sciences; and Dr Parks, head of the Chemistry Dept at URI.

I would like to ask, as I call out the names of the various schools represented here, that the gentlemen present from each stand for just a moment: New Bedford Institute of Textiles and Technology, Bradford Durfee Technical Institute, Rhode Island School of Design. (Applause). Thank you very much.

We have had a change in plans this evening. I don't know whether all of you recognize the fact that this is not the Governor sitting on my right. We have had word from the State Department expressing the regrets of Governor Roberts that he could not be with us this evening. He planned to be down here right up until two o'clock this afternoon, but the pressing amount of work in the legislature meant that he was headed for an all-night session. However, today I have become a believer in the old adage, "it's not what you know but who you know." At two o'clock this afternoon we were really lost for somebody to take his place on the speaking program. I called back to the plant and talked to Mr Broadbent, and he didn't seem a bit concerned about being asked to speak. After all, I had given him almost three hours' notice. When he arrived here tonight I didn't know what he was going to speak about and he said he had a few doubts about that too. However, the subject of his talk tonight will be, "We Want But Little." Mr Broadbent.

WE WANT BUT LITTLE

ELLIOT BROADBENT

Glenlyon Print Works

I CAME here tonight for one reason only, and that was to have a chat with the Governor. You can imagine, then, my surprise, and shall I say my horror, when I learned that the Governor was not coming, but that I should get up and talk to help out the situation. So if you students feel that you are short-changed by having to listen to me, just imagine how I feel.

When this assignment was passed on to me in the middle of this afternoon, I asked what I was to speak on. Since, among my doubtful claims to fame, I am supposed to be some sort of an authority on sewage disposal, I told Mr McLean I could start even below the bottom and work up, and for him to pick the subject. Mr McLean replied that he would rather I leave the sewers down where they belong and talk about anything else. That didn't help me very much.

Yesterday, my fellow speaker, Mr Jacoby, called me and said, "I am to address the Textile School Students tomorrow night. An old patriarch like you should have some words of wisdom for young men interested in the textile business." I was extremely busy at the time, and I said, "I have indeed, and I can sum it up in one sentence—Just get out of the business as fast as you can." Mr Jacoby didn't feel that that was the proper answer for him to carry on to you students. So I told him to call me later when I wasn't quite so busy. This he did. I then told him that here was the foundation for a good talk. If you want to become prematurely old, prematurely gray, prematurely bald, to be extremely interested and extremely interesting for the rest of your working years, then you should embrace the textile-finishing industry.

However, upon getting this assignment, I told him that he couldn't use that for his theme, because I was going to use it myself. And so, men, if you want to achieve any of those rather doubtful attributes, here is how you do it:

First of all, do a little quick self analysis. If you find that you like laboratory work, that you like research problems, and that you don't like to be too annoyed by outside influences, then by all means go into research work. It can be interesting, fascinating, won't pay much as a rule, but you can achieve a lot of happiness and a lot of satisfaction in that line. On the other hand, if you like to fight, and you really want to be in the middle of a lot of activity, then choose the manufacturing end, or the selling end.

I remember years ago I addressed a student night of the AATCC. I told the young men at that time that, if they wanted to make a nice, comforable, easy living, then they should all become dyestuff salesmen, but I understand that now-

* Held at Lippitt Hall, University of Rhode Island, Kingston, R I, on Friday evening, April 22, 1955.

adays you even have to work at that.

Now, if you should choose either of the latter courses, it is not essential that you become an extremely accomplished research chemist by any means. Actually, all the chemistry and physics you need to know is to converse understandably with the chemists and engineers in your own plant, and, of course, know the language of the science of chemistry and physics so that you can impress your customers. So, you see, after having made your decision the rest is easy; and if you don't mind long hours, hard work, constant troubles, it is even easier than that.

Now, of course, you might very well turn around and ask me why I have sacrificed a beautiful head of curly hair for this strange finishing business; then I would have to reply that I have enjoyed doing it. Actually, this finishing business is just as stimulating and just as fascinating to me today as it was the first year of my life in the textile-finishing business. There is always something new—some new problem to keep your mind active and your body tired.

You might also ask what do we in this business ask of you young men who are considering entering into our business? What also do we think of your chances of operating here in New England? Well, you remember the poem "Man wants but little here below." Actually, we want but little of you, but we want that little very badly. We are not too keenly interested in your background of physics and chemistry. As I said before, if you know enough to talk about these sciences intelligently, that is enough for us. What we want are the attributes you were actually born with. That seems little to ask but I am sorry to say that in a great many cases you have dispensed with them. I am always extremely fascinated by a young child's approach to everything in life. Those of you who are fathers know that if you take your young child into, say, a grocery store, the child will bother you with questions. "Where does this come from?" "Does this grow on a tree?" "How is this made, daddy?" and so forth. Then either because you, as a father, haven't had time to answer all his questions or because some teacher has displaced you as a fount of learning, the child stops asking questions and then begins to take everything for granted. If you boys will take nothing for granted, and investigate everything that occurs which is strange to you, then you have begun to develop along the lines we need.

Another attribute which is also given to us as children is that wonderful one of imagination. Did you ever stop and watch children play? They can conjure up in their minds everything they need to give them perfect happiness and enjoyment in this playtime. Again, somewhere along the line, most of us lose that valuable property. I never have been able to find out why, but I can tell you this: the best men in our business, or any other, are all gifted with tremendous powers of imagination. I heard a story the other day which typifies what I mean: The young boy asked his father to give him some information about the Jelke case. The father was rather loathe to discuss a case involving morals with his young son, but he and his wife had always said that they would tell their boy everything and answer any questions, regardless of their import. At first the father said, "Well I think you are too young to ask questions of that type, son." But the boy persisted—and so the father finally said "Well, son, what is it you want to know?". And the son replied, "What is oleo margarine?". You see there the thirst for knowledge which the youngster had. In another ten years, of course, the boy's mind would run along different lines and I rather fancy that he might seek the answers himself and give his imagination full rein.

Another attribute we seek is what I would call "Spirit." The desire to excel, the desire to compete and the desire to overcome all obstacles. These three simple attributes seem to be extremely difficult to come by. Why, I really don't know, because, as I said before, we are all born with them. I am quite sure that if we had a young man with all those attributes, if he knew little or nothing of chemistry and physics, we could make a valuable man out of him.

So, you see, the things that we want most you were all born with. Strangely enough, most young men today seem to come to us without this equipment. These are the first questions they ask: Do you have a retirement policy? How long will our vacations be? And do we have a sick leave? Well, you can imagine when we see a young man wondering about his sicknesses and his vacations, and his retirement, we really wonder how we older fellows have lived this long without worrying about those details. Let me recite a poem which covers this subject quite well:

Mary's Son

If you stop to find out what your wages will be
And how they will clothe and feed you,
Willie, my son, don't you go on the Sea,
For the Sea will never need you.

If you ask for the reason for every command
And argue with people about you,
Willie, my son, don't you go on the Land
For the Land will do better without you.

If you stop to consider the work you have done
And boast what your labour is worth, dear,
Angels may come for you, Willie, my son,
But you'll never be wanted on Earth, dear!

—Rudyard Kipling—

Another question which I thought you might ask was "What of the textile business in New England? Does geography mean so much? Certainly we in New England have not equipped ourselves for high-speed production work to the same extent that those in other areas have. Fortunately, there is still a market in the world for high-quality goods. You young men with perfectly straight up-and-down fronts have no trouble in buying a ready-made suit, but when your front begins to develop like mine has, then you have to go to some local tailor. So you see, in spite of the fact that ready-made clothing can be made more cheaply on high-production lines than can the hand-tailored suit, there is still room for the local tailor. The same thing is true in our business. Many of the large vertical textile companies own large print works of their own. One of them operates the largest print works in the U S. I can even say "in the world." These companies come to New England printers who are comparatively small producers for their high-quality lines. A plant doing high-quality specialty lines needs more trained personnel than a plant specializing in high-production work only.

After more than 35 years in this business, I still feel that textile work can be done profitably in New England with good management and good skill, and with men with imagination and the questioning approach. As I said in the beginning, life in a finishing plant is a hectic way of making a living. It is also fascinating and interesting. You will find, as the years go by, that you will gradually become a textile technician, a labor relations man, an accountant and a salesman. In addition, you will be sure to develop into a comforter for a host of prima donnas working with you. Fortunately, it's really simple if you will use your imagination, keep a questioning mind, and are not afraid of hard work or losing your hair.

* * *

CHAIRMAN McLEAN: Thank you, Mr Broadbent. Our next speaker this evening is an individual who has done a tremendous amount for the Rhode Island Section. A past chairman of the Section, he has served on Intersectional Contest Committees and has contributed a great deal. We are very sorry to lose his support on the committees in this Section, but we are also very proud of the fact that he now is president of the AATCC. In addition to that, he is chairman of the Perkin Centennial, which will be held next year. Mr Jacoby's subject this evening is, "New Developments in the Textile Field and the Future it Holds for Students." Mr Jacoby.

NEW DEVELOPMENTS IN THE TEXTILE FIELD AND THE FUTURE IT HOLDS FOR STUDENTS

RAYMOND W JACOBY

Ciba Co, Inc

AT the outset I want to say that I am here tonight under false pretenses. When Jimmie Shore spoke to me awhile ago about appearing here tonight, he said the other speaker was going to be Governor Roberts. I do not mind competing with any Democrat, even if he is a governor, but when, at the last minute, they run in a Republican sewer commissioner from East Providence, that's hitting below the belt.

Mr Broadbent gave you some very good advice, but as to a few of the points he made, well, I have to admit he is a good mill manager but I do not think he is a good salesman. He could not sell me a bill of goods on the fact that many years in the textile business makes one prematurely old, prematurely bald and prematurely gray. Certainly he, who has spent many years in the textile industry in Rhode Island, is not prematurely old. He has rosy cheeks and there is not a line in his face; as far as being prematurely gray, you cannot even tell that. As far as being prematurely bald, I do not think it came from worries about the textile business. My own personal opinion is that it proves that grass never grows on a busy street.

In thinking about this meeting and reading the papers the last couple of weeks I began to wonder what I was up against. I have here a clipping from the *Providence Sunday Journal*, dated April 10th, in which it quotes Mr Rieve, president of the Textile Workers' Union of America. In referring to his discussions with the millmen, it quotes him as follows: "I would say to the workers, 'Get the hell out of the industry and get out fast.'" Last Sunday the *New York Herald Tribune* had a little article on the financial page about Patrick McGinnis, president of the New York, New Haven & Hartford Railroad. I'd like to read you a few lines from this item: "Mr McGinnis prescribed a bold operation for New England's ills: 'The hell with textiles, get something else.'" So about that time I decided the only thing left for the textile industry was to make asbestos fabrics down in Hades.

Just about the time I was ready to inter the corpse I picked up the *Daily News Record* of Monday, April 18th. There were two articles in it discussing the textile industry, and I would like to read you paragraphs from each of those two articles: "A population increase of 3,000,000 a year, continuous rise in standards of living, and a greater average income per family will create an ever-increasing potential market for textiles during the next twenty years." And the other, "More Americans with more money to spend and more time on their hands to dispose of it promise a fabulous future for textiles in the next two decades."

About that time I began to think of the story of Mark Twain who said the stories of his death were greatly exaggerated. Now I know there is a lot of bad in the industry; but there is also a lot of good in it. The thing for us to do is to try to get facts, to get to the truth even though it may sometimes be disturbing or even painful.

Textiles are very old; how old none of us know. When archaeologists made excavations in areas that had an early culture they always found samples of textiles. The age of these textiles was determined by associating them with historical periods with which we were familiar, but more recently a method has been developed for determining the age of any item by measuring the radioactivity of carbon 14. As you know, Peruvians, centuries ago, had a highly developed culture. The high, dry climate of the Andes, together with their method of embalming bodies, permitted their handiwork to endure for centuries. I have here a piece of a Peruvian mantu, whose age was determined by measuring the radioactivity of carbon 14. It was determined that this piece of cloth was made between 250 and 300 B C. In other words, this piece of cloth is over 2,200 years old and it looks no different than a piece of similar fabric made today.

One odd thing about the textile industry is that the two basic principles involved in the production of textiles have continued unchanged through the centuries. These are: to draw the fibers out parallel and twist them into yarns, which we call spinning, or in the case of continuous filament yarn, twisting; then interlacing these fibers to form pieces of cloth, which we call weaving. In spite of the fact that these two principles have remained unchanged for centuries there have been tremendous changes in various factors having to do with their production. For centuries man depended upon nature for the fibers for textiles: the hair of animals, such as camels, sheep, goats; fibers from vegetable material, such as cotton, linen, jute, and hemp; and the filament from the silk worm.

The silk worm is an industrious, rather interesting little creature. From the time the baby worms are hatched from the eggs they spend their entire life on mulberry leaves; all they do is eat mulberry leaves. That enables them to grow to maturity, and when they are mature the leaves continue to provide sustenance. Part goes into their bodies, turns into liquid that is extruded from an orifice in the tail, and forms the filament from which the silk worm spins a cocoon. We are told that Adam and Eve wore leaves in the garden of Eden, and we think we have come a long way from there, but have we? Any of the young ladies here or our wives are very proud of a silk dress, but when they are wearing silk dresses it is not very different from Eve; they are still wearing leaves, but those they are wearing have been put through a silk worm. When man decided he wanted to make fibers and not rely on nature, he followed the procedure of the silk worm, which is to make a liquid and extrude it through orifices called spinnerettes.

Among the greatest developments in recent years are the various new fibers. As I said at the start, there is good and bad in all phases of the textile business and there is good and bad in the various fibers. They have certain properties which make them very valuable, and which, at the same time, present difficulties. These fibers are thermoplastics, which when heated under certain conditions, will, as far as possible, retain those conditions. That is the basis for the fabrics made from these fibers being crease-resistant; when pulled out smooth and heated under those conditions they will tend, as far as possible, to remain that way or return to that smooth condition, which is a great advantage in fabrics which you wash and do not have to iron. But the very fact that they are plastic, and act that way, presents many difficulties in sewing. Today, in commercial garment industries, sewing machines operate as high as 5,000 stitches per minute with the result that the needles get extremely hot. You have seen shirts, or various other garments made from some of these fibers, all puckered at the seams due to the fact that the

heat of the needle causes the material to stick to it.

Thermoplastics are hydrophobic, that is, they repel water. This has tremendous advantages. Garments made from these fibers can be washed out at night, and because they absorb very little water, they are dried out by the next morning. But again this very property of not absorbing much water has some disadvantages. They do not absorb the amount of water or moisture that other fabrics do, so they feel uncomfortable and also develop static.

The advantages of these fibers are being added to the good properties of other types; they are finding a tremendous place in blends, and I am sure they have an enormous future.

The plastic fibers serve to point out how somebody with a little bit of thought can really produce something which is outstanding. You are all familiar with the one-size stretch socks for all sizes of feet. That development has had a tremendous impact upon the hosiery business. It is based upon a very simple proposition. Thermoplastic fibers are given a very high degree of twist, eg, 83 turns per inch, and in that condition they are heated so that the twist is set. They are then put back on a twister and untwisted down to about three turns per inch. The result is a fiber which is like a corkscrew, and having been set in that corkscrew condition it remains so. This is why you have these socks that stretch so very much.

A second great development is the resin finishes. These are produced mostly with thermosetting resins. One of the characteristics of these resins is their "memory"; they tend to retain the conditions under which they are set or cured. With the use of these resins a myriad of effects are produced whereby an ordinary piece of sheeting can be made to resemble a piece of waffle cloth, pique or glazed chintz. Embossed effects, basket-weave effects, goods that look as if they are decorated with sequins, and cotton sheetings which look and feel like a piece of silk taffeta are also possible.

On a recent trip to the Pacific Southwest Section I took a lot of these samples, many of which were produced right here in Rhode Island. Although everybody there was connected with the textile business in some way or other, I was surprised to find that a number of them expressed amazement that such wonderful work was being produced. I used the expression, "Cotton is king again." After I came back East I had a letter from one of the men who attended that meeting. In it he said, "I went to the meeting the other night and heard you say 'Cotton is king again.' I agree. I am sending herewith a page from the *San Francisco Chronicle*." This is the page . . . up in the corner is a picture of a cotton faille dress, strawberry print, print on a white ground. The price of that dress—hold your breath—is only $395. In this corner is a silk dress, dyed and printed in a polka-dot pattern. This dress is only $110; if King Cotton is too rich for your blood you can buy a silk dress.

The textile industry is a necessary industry. The three requisites for human survival are food, clothing and shelter, and obviously textiles are very important since they are the basis of our clothing. Considering the question of a future, we can be sure that the textile industry will always be with us in one form or another. There are very few industries which are on the way out, but I admit there are some. The *New York Herald Tirbune* of April 10, 1953, had this little article in it: "The Carriage Wagon Woodstock Implement Association had its 75th convention at New Orleans last week; the surviving members discussed such topics as jets, atomic power and flying saucers. Suddenly the Arkansas delegate jumped up and with set jaws said, 'Boys, we're on the way out.' They were down to four and will meet no more." If you are considering going into the wagon business I do not think you will have much of a future, but when you consider any industry you will find that there is success and failure in every one. As you students get out into the world you are going to find things which will be very confusing. For instance just the other day there was a news report to the effect that it was estimated there will be 65,000 business failures during the first six months of this year. That is an increase of 21% above last year. The day after I read that, I listened to the radio and Secretary Weeks was quoted as having said that 1955 is going to be the biggest year in the economy of the United States. Yes, there is success and failure in every industry.

Nobody would belittle the difficulties that confront New England. I appreciate what Mr Broadbent said; there always will be a place for some, but the industry in which you serve does not constitute a basis for determining whether there is a future or not except in a few rare occasions. During my lifetime I have seen the automobile business grow into a real industry. I remember when the first automobile came to our town. It was built just like a buggy with high wheels, no top, no windshield, just a dashboard in front, and on the dashboard was a whip socket and a big whip. The idea was that the driver would use the whip to whip us kids off when we hooked rides behind. We could catch it going up hill but down hill it got away from us. Since that time we frequently have seen the figures relative to how many automobiles there are in the country in relation to the total population. The figures point up a terrifically expanding industry, but just being in the automobile industry is no guarantee of success. I could mention scores of makes of automobiles that, I am sure, many of you students never heard of, automobile companies that came into being, produced cars, passed out and were forgotten. We hear a lot about competition from other areas. I would not belittle that at all. These millmen active in the mill business today know how serious it is. Mr Broadbent spoke about competition and the opportunities in New England, but realize this: just being in any area is no guarantee of success. Very recently, reports of two big southern mills were published six days apart in the financial papers. These were big organizations. Their sales totalled about $100,000,000 a year, which is certainly a large volume of business. At Mill A, (comparing 1954 with 1953) 1954 sales were up 1.4%, profits were up 82.3%. At Mill B, in the same area, 1954 sales were off 17.4%, and profits were off 67.0%.

Ladies and gentlemen, just being in a certain area is not the answer. I will admit there are certain disadvantages in New England but there are also certain very definite advantages. Through the last few years the number of employees in the textile industry in New England has been steadily decreasing. During that same period the number of employees in the garment industry here has been increasing. I will admit that the major portion of the work-clothing industry has gone to the South Central and South Atlantic states, but high styling in the garment industry is still in New York and New England. A late government report shows that the total number of the employees in the United States in the garment industry is 1,108,922. Of that number 715,622 are in the Middle Atlantic states and New England or 65% of the total. These areas have definite advantages for the high-styled-garment industry, and with earnings at an all-time high, the market for high-styled goods is constantly growing. In this field, close contact is necessary between stylists, designers, cutters, converters and finishers. The personal touch is imperative. Direct contact is possible in a few hours at the most. Secondly, a very quick turnover is essential. Quick delivery of goods at all stages is imperative. In this area of high-styled goods, delivery is only overnight at the most.

A mill manager recently told me about a customer of his, a converter who sold goods to a garment manufacturer on Thursday morning. The garment manufacturer in turn got an order from a big

department store in New York. The converter called the mill and ordered the goods shipped that afternoon. Friday morning, when the garment manufacturer opened for business, the goods were there. They were cut and sewed Friday and Saturday morning, and delivered to the department store Saturday afternoon. The New York newspapers on Sunday ran big ads about these garments going on sale Monday morning, and they *were* put on sale, at 9:30 Monday morning when the store opened. That is the way industry is working today.

While it must be admitted that the textile industry faces certain disadvantages in New England today, let us not lose sight of some of its advantages, such as its proximity to the center of the high-styled garment industry.

Too many of us are prone to think that the problems we face today are unique. A mill manager recently was discussing with me his problems in operating, saying: "Just think, our wages average $1.65 an hour. Under these conditions we have to be careful. We cannot have a machine idle, and we cannot have on the payroll a man we do not need." Admittedly he has a serious problem, but it so happened that I began my career in the finishing industry in Rhode Island over 40 years ago at a time when wages averaged 14c an hour. Oddly enough, I used to hear at that time "We cannot keep a machine waiting; we cannot have an extra man on the payroll; at 14c an hour we have to be very careful about our help." I predict that, 40 years from now, we will hear something like this: "In 1955 wages averaged only $1.65 an hour. They had no worries then compared to now."

OPPORTUNITIES IN A TEXTILE CAREER———Mr Broadbent has outlined some of the opportunities awaiting young men in the textile industry, especially in regard to the various phases of plant operation. But when we speak of "the textile industry," let us not think only of the production of textiles. For example, the manufacture of textile machinery is an important segment offering tremendous opportunities for originality and thought. The manufacture of the various supplies and finishes required in the production of textiles is another segment which continues to grow. Then, of course, there is the problem of distribution involving salesmanship, which has lots of opportunities.

But let me say to you students again that your future is not going to depend upon the industry in which you choose to serve. The most important thing of all is *you*. Right now, you, as students, are probably making the first and most important investment in your lives. You are investing an appreciable amount of money. When you make an investment you buy something—a piece of land, a house, stocks, bonds, machinery, etc. In this current investment that you are making, what are you buying? The future is going to depend equally as much, if not more, on some of the things which you will not learn in books.

It seems to me that the three things that are going to help you the most are: first, real vision; secondly constructive inquisitiveness, taking nothing for granted; and thirdly, a burning zeal and desire to get somewhere. Your future will depend upon what you do when *you* get into industry. What are *you* going to do? Are you going to be content to drift with the tide, afraid to strike out on your own, afraid to take the initiative because you might make a mistake? Remember, the only person in the world who never makes a mistake is in the cemetery smelling the wrong end of the daisies. Are you going to be afraid to try; for fear you might be wrong? If you feel that way your future is already behind you. Let me tell you this: Don't be afraid that you might be wrong, because you cannot always be so. Even a clock that is not running is right twice every twenty-four hours. I speak of vision. You will find that vision is necessary because, during my lifetime, an entire change has come over the industry. There used to be a time when competition came from within, from people we knew, from companies we knew. But today, with the rapidly changing industrial picture, competition comes from without. Real, serious competition does not necessarily come from within one's own industry; it frequently comes from outside. That is why you need vision to realize it. Suppose that you were making handkerchiefs. You would know the cost of the raw material. If you knew the technical details you would know what could be done in spinning, weaving and finishing. And you would know what your competitors could do in producing handkerchiefs. But where would the real competition come from? Not from other handkerchief manufacturers, but from people who make Kleenex and other disposable tissues. Suppose you were to make napkins in the textile industry? You would know what your competitor could do, but your real competition would come from the paper industry. If you were to make towels, the same thing would hold true. The serious competition would come from the people who learned how to make wet-strength paper——paper towels made to be used, washed and reused.

There is another point to bear in mind, namely, that it is the end that counts rather than the means. Do not waste time quibbling about this, that or the other method when it is the result that counts. Let me cite an example. There was a church that had a very high steeple and a ladder extended to the very top. Four men, a physicist, a scientist, an engineer and a salesman were assembled. Each was given a very accurate barometer and told to use it to find out how high the steeple was. The scientist calibrated it at the ground, took a careful reading, climbed to the top of the steeple, took another reading, and calculated the height of the steeple. The physicist took a stop watch along with the barometer, climbed to the top, dropped the barometer, measured the length of time it took to fall to the ground, came down and calculated the height of the steeple. The engineer took a ball of string along with the barometer, went to the top, tied the string around the barometer, lowered the barometer to the ground, made a knot in the string, pulled it up, climbed down and measured the string. The salesman took the barometer, went into the church, got hold of the janitor, and gave him the barometer for telling him how high the steeple was.

Now I know that you have heard a certain old cliche time after time, but I assure you young men particularly that it is just as true today as it was the first day I heard it: "Good men are still hard to find." I know — I have seen the time when I said, "What does all that mean? Here I am. Why don't they find me?" Unfortunately, the man looking for the job and the job looking for the man do not coincide very often, but that does not mean that the statement is not true. It is a fact, and it will continue to be. Mr Broadbent indicated some of the things you should think about. That is what he wants in men and he is trying to find it. I think he will agree with me when I say that it is pretty hard to find.

In conclusion, I should like again to say to you students: Do not think so much about the industry which you choose to enter. Think more about yourselves, for if in these formative years of your life you acquire vision, constructive inquisitiveness, and a burning zeal, along with a belief in the industry you enter and the country in which you live, and above all a belief in yourself, then your future is very bright. Then, and only then, can you follow that old precept, to hitch your wagon to a star.

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CHAIRMAN McLEAN: Thank you Mr Jacoby.

I would like to express the thanks of the Rhode Island Section to the University of Rhode Island, Dr Browning, and Dr Parks for a pleasant welcome; and to Dr Parks and Jim Shore, thanks for an excellent meeting.

Piedmont Section———

AN IMPROVED PROCESS FOR DYEING NYLON FABRICS WITH ACID DYES*

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INTRODUCTION

PHYSICAL and chemical irregularities present in fabrics woven or knitted of continuous-filament nylon are manifested by streaks and/or barré effects when acid dyes are applied by normal dyeing procedures. Hence, the piece-goods dyer has been unable to use these dyes with their superior washing fastness and range of bright shades.

Unlike acid dyes, disperse dyes have been recognized as a color class that does not emphasize the nonuniformities as dye defects. When applied under normal dyeing conditions, they diffuse levelly into the separate nylon fibers.

In addition to this "level striking" property, the disperse colors have excellent migrating properties at temperatures below 212°F, a factor known to enhance levelness. With acid dyes, a distinctly different behavior is observed. Acid colors are initially absorbed unequally by the different yarn bundles in a given nylon fabric, and the poor transfer properties of acid colors under normal conditions make it difficult to overcome the initial unlevel strike. It is therefore logical to assume that, for successful dyeing with acid colors, dyeing conditions should be so modified that their behavior resembles that of the disperse colors, ie, the acid dye must be absorbed initially with better levelness and must possess a significant degree of color migration under practically attainable dyeing conditions.

It is the purpose of this paper to discuss advances made along these lines, and specifically to describe a method for obtaining improved dye uniformity of nylon fabrics with acid colors by dyeing at temperatures above 212°F in the presence of an assistant which promotes transfer of color at the elevated dyeing temperatures.

Brooks

Reith

The production of level shades with acid dyes on filament-nylon fabrics by normal dyeing procedures is extremely difficult. Although these dyes are desirable from the standpoint of brightness and wash fastness, they tend to emphasize differences in nylon yarns that are due to physical and chemical nonuniformities and give dyed shades a distinctly streaked, or barréd, appearance.

This paper describes how acid dyes can be applied levelly and with good coverage by a modified technique at 235-250°F in the presence of 2% Duponol D Paste owf.

This sulfated dyeing assistant, which minimizes the normally unlevel strike of acid dyes, is effective in promoting a striking degree of color transfer with resultant improved levelness at dyeing temperatures of 235-250°F. The magnitude of improvement offered by the new method is described, and the selection of dyes most suitable for optimum results is discussed.

Such an assistant is Duponol D Paste, a long-chain fatty-alcohol sulfate.

Pretreatment of the nylon fabric with 5% Duponol D Paste owf (on weight of fiber) in an acetic acid bath at 212°F has been recommended *(1)* as a method for obtaining improved levelness with acid dyes. In other instances the use of high concentrations of this and similar compounds in the dyebath has been found to show improvement in reducing barré, or streaked effects. However, in operating such procedures up to 212°F, only weak shades have been practical with many acid dyes. The reason for this is that the colorless alkyl sulfates, by virtue of their anionic character, occupy many of the available amine-end dye sites in the nylon fiber. They therefore tend to exclude the dyes, and, since there is little transfer of the Duponol D Paste at temperatures up to 212°F, the color build-up is poor under these conditions with the true acid-dyeing colors.

More recent studies on the application of acid colors have demonstrated that these dyes can be applied with greatly improved levelness in a full range of shades at 235-250°F if Duponol D Paste is included in the dyebath. The amount of the agent required is roughly equivalent to one-half the amine titer of the nylon fiber. In this procedure, the Duponol D Paste again functions to minimize the initial unlevel strike and also to promote a marked increase in color transfer, or leveling, at dyeing temperatures of 235-250°F. Of particular significance is the fact that good color exhaustion is obtained at these elevated temperatures, thus permitting good reproducibility and effective production of deep shades.

With the increasing commercial use of high-temperature dyeing equipment, this new procedure becomes of particular significance as a commercial dyeing method, suitable for dyeing nylon with acid colors. Several successful plant trials support this conclusion.

DISCUSSION

DYEING EQUIPMENT———For the dyeing of tricot and open-weave fabrics under pressure, the Burlington Pressure Dye Machine[1] is available and suitable for dyeing at temperatures up to 236°F, or 8.5 pounds gauge pressure. A laboratory-scale model is on location at the Textile Research Laboratory. With this miniature equipment, fifty yards of approximately 15-inch-width tricot or similar open-weave fabric may be processed to yield a load representing a goods-to-liquor ratio of 1:8.

High-temperature dyeing up to 250°F may be carried out on the more dense or heavier nylon constructions in the Barotor *(2)*. Several commercial machines are now installed, including installations in

* Presented by J A Brooks in the Robert E Lee Hotel at the Spring Meeting of the Piedmont Section on the afternoon of April 30, 1955, in Winston-Salem, North Carolina.

NOTE: The names Duponol, Pontamine, Pontacyl, and Celanthrene, are registered trade-marks of E I du Pont de Nemours & Co Inc, Wilmington, Del.

[1] Burlington Engineering Company, Inc, Graham, N. C.

two commission finishing plants.

For the investigation of variables in process, characterization of dyes, and the matching of shades at elevated temperatures, the Du Pont pressure dyeing machine has been developed *(3)*. This equipment duplicates at high temperature the functions of the ordinary laboratory dye pot. It consists of a battery of ten stainless-steel tubes, which are tumbled in an atmosphere of steam maintained at the desired temperature. Temperatures up to 300°F are possible with this equipment.

COLOR SELECTION———A commercial semidull-nylon tricot fabric was used in tests to characterize an extensive list of commercial acid- and direct-color types for their ability to cover nonuniformities normally encountered in dyeings made with acid colors at 212°F. In this test, 0.25% of individual acid dyes were applied for one hour at 250°F in the presence of 2% Duponol D Paste and 2% glacial acetic acid, all owf, at a liquor ratio of 1:40.

This characterization study clearly indicated that not all acid dyes give satisfactory levelness. Thus, an important requisite of the improved Duponol D process is proper dye selection. A complete shade range can be obtained by selecting specific colors from dye classes designated in the trade as milling-acid, acid-dyeing-direct, and special neutral-dyeing colors. The required degrees of levelness and transfer were not shown in filament-nylon fabrics by premetalized dyes of either the acid-dyeing or neutral-dyeing type.

Based on this study, the following dyes are recommended as the preferred selections in the milling and direct-dye classes. These produce good coverage of normally barré cloth. They also show good transfer properties when dyed at 235-250°F from dyebaths containing 2% Duponol D Paste and acetic acid.

	Colour Index No.
Pontamine Fast Yellow 4GL Conc	Pr 53
Du Pont Milling Yellow 5G Conc	642
Du Pont Orange II Conc	151
Du Pont Anthraquinone Rubine R Conc	1091
Du Pont Crocein Scarlet N Extra	252
Pontamine Fast Red 8BLX	278
Du Pont Athraquinone Iris R	1073
Du Pont Anthraquinone Blue SKY	1068
Du Pont Anthraquinone Blue SWF Conc 150%	Pr 12
Du Pont Anthraquinone Blue RXO	1076
Du Pont Anthraquinone Blue 2GA	..

Although not level dyeing in light shades, Du Pont Milling Red SWB or Pontamine Scarlet 3B dye level in deep red and scarlet shades. Pontamine Scarlet 3B is preferred for its ability to cover nylon fabrics more uniformly. Pontacyl Fast Blue 5R Conc (CI 289) is recommended for navy shades, showing satisfactory coverage in 1.5-2.0% color depths. Best results are obtained when this color is dyed from dyebaths containing 2% Duponol D Paste owf, and color exhaustion is obtained from a neutral dyebath with 5-10% magnesium sulfate *(4, 5)*. The usual practice of exhausting this color with acetic acid from a dyebath containing sodium bichromate is to be avoided in high-temperature dyeing. This blue color dyes less level and has poorer stability at 235-250°F at pH values in the range of 4 to 5. The addition of bichromate is not effective in increasing stability at elevated temperatures. These problems are not encountered in the neutral-dyeing procedure with this dye.

Important level-dyeing properties are to be found in certain special neutral-dyeing colors. These types appear essential for specific combination color shades, such as grey, tan, and medium brown, on fabrics that are inherently difficult to dye with acceptable uniformity. Examples of the type are

Nylanthrene[2] Yellow FLW
Pontacyl Scarlet NN
Celanthrene Fast Blue GSS

The range of special neutral-dyeing colors is not suitable for many bright shades; they are either inherently duller than the acid-milling colors or are of a hue which is unsuitable for certain bright shades. In addition, their washing fastness is inferior to that of acid-milling colors. However, good wash fastness is obtained with these colors by aftertreatment at 200°F with 2% tannic acid, followed by the addition of 2% tartar emetic. Dulling of the dyed shades by this aftertreating procedure is greatly diminished by adding initially to the aftertreating bath an organic sequesterant like Versene[3] regular.

EXPERIMENTAL

A number of experiments were performed to evaluate the high-temperature dyeing method using Duponol D Paste with acid dyes, and the results are discussed in the following section.

TABLE I
MIGRATION PROPERTIES

Fabric dyed with %	*Comparative transfer properties at 235°F*	
	acetic acid only	*acetic acid + 2% Duponol D Paste*
1.5 Du Pont Milling Red SWB Conc 125% 2.0 acetic acid, glacial	nil	good
1.5 Pontamine Fast Red 8BLX 2.0 acetic acid, glacial	nil	good
1.5 Du Pont Anth Green GNN 1.2 Du Pont Milling Yellow 5G 2.0 acetic acid, glacial	poor	good
0.25 Du Pont Anth Iris R .10 Du Pont Anth Blue 2GA .02 Du Pont Anth Green GNN 1.0 acetic acid, glacial	good	very good

COLOR ABSORPTION———A mixture of acid dyes to produce a bluish green was dyed on a nylon tricot of relatively poor quality by the following methods:

1) Conventional dyeing at 212°F (no Duponol D Paste)
2) Dyeing with 1% Duponol Paste D Paste at 212°F
3) Pretreating at 212°F with 1% Duponol D Paste + 2% acetate acid and subsequently dyeing at 212°F
4) Dyeing at 250°F from a dyebath containing 1% Duponol D Paste and 2% glacial acetic acid both owf

Examination of the shades and measurement of residual bath color from wool exhaust dyeings indicate that

1) A marked reduction in exhaustion is obtained in all 212°F dyeings involving Duponol D Paste.

2) Improved dye levelness is produced by addition of/or pretreatment with Duponol D Paste at 212°F.

3) The swatch dyed at 250°F in the presence of Duponol D Paste exhibits much superior levelness over the control dyed at 212°F. Furthermore, the color depth on the nylon demonstrates that color build-up was not objectionably affected by the presence of the leveling agent at the high temperature.

MIGRATION PROPERTIES AT 235°F ———Typical acid colors were dyed initially on a nylon tricot fabric both as individual dyes and in combination to produce shades of deep red, green and blue violet. The original dyeings were then divided and subjected to the usual transfer test, in which equal-size pieces of undyed and dyed fabric are treated in a dye-free fresh bath containing sufficient acetic acid to exhaust any desorbed color. Duplicate sets were treated at 235°F with and without

[2] Althouse Chemical Co, Inc, Reading, Pa.
[3] The Dow Chemical Co, Midland, Mich.

TABLE II

EFFECT OF TEMPERATURE AND DUPONOL D ON LEVELNESS RATINGS

	Duponol D Paste		acetic acid only
	190-200°F	235°F	235°F
1.5 % Du Pont Milling Red 8WB Conc 125% 2.0 % acetic acid, glacial	5	7	4
1.5 % Pontamine Scarlet 3B 2.0 % acetic acid, glacial	5	9	5
1.0 % Pontamine Fast Red 8BLX 0.3 % Du Pont Anthraquinone Rubine R 2.0 % acetic acid, glacial	5	9	5
1.5 % Du Pont Anthraquinone Green GNN 1.2 % Du Pont Milling Yellow 5G 2.0 % acetic acid, glacial	5	7	7
0.25% Du Pont Anthraquinone Iris R .10% Du Pont Anthraquinone Blue 2GA 0.2 % Du Pont Anthraquinone Green GNN 1.0 % acetic acid, glacial	6	7	4

TABLE III

COMPARISON OF DYEBATH ADDITIVES AT 212-235°F FOR SPECIAL NEUTRAL-DYEING COLORS IN A DARK SHADE*

	Levelness ratings				
		2% Duponol D Paste			
Time/Temp	no asst	—	10% $MgSO_4.7H_2O$	0.25% HOAc	0.25% HOAc
Dyeing (grey) 2 hours at 212°F	7	8	10	9	7
Transfer 1 hr at 212°F	fair	fair plus	fair	fair minus	nil
Dyeing (grey) 2 hours at 235°F	7	8	10	10	7
Transfer 1 hr at 235°F	good	good	good	good-minus	poor
* Color combination	Dark grey				
Nylanthrene Yellow FLW	0.18				
Pontacyl Scarlet NN	.80				
Celanthrene Fast Blue GSS	.90				

TABLE IV

COMPARISON OF DYEBATH ADDITIVES AT 212-235°F FOR SPECIAL NEUTRAL-DYEING COLORS IN A LIGHT SHADE*

	Levelness ratings			
	dye only		dye + 2% Duponol D Pst	
Time/Temp	212°F	235°F	212°F	235°F
Dyeing (grey) 2 hours at temp	5	5	8	9
Transfer 1 hr at temp	poor	poor	fair-good	good
* Color combination	Light grey			
Nylanthrene Yellow FLW	0.01			
Pontacyl Scarlet NN	.04			
Celanthrene Fast Blue GSS	.05			

2% Duponol D Paste owf in the dye-free liquor. The comparative results of these transfer tests, summarized in Table I, attest to the improved leveling obtained with Duponol D Paste.

EVALUATION OF IMPROVED UNIFORMITY———A bar-and-bar type 670/200 nylon tricot fabric found to dye particularly unlevel in normal commercial acid dyeings was dyed in a range of shades to illustrate the magnitude of improvement obtained from dyeing by the preferred method. The results of sample swatch dyeings are shown in Table II, representing a control dyeing at 200°F and duplicate color dyeings at 235°F, one with and another without Duponol D Paste in the acid dye liquor.

A numerical rating has been given to each swatch. A rating of 10 would indicate very good dye uniformity, and lower ratings indicate correspondingly poorer levelness. A rating of 7 indicates questionable acceptableness. These ratings indicate a marked improvement in quality for the dyeing made by the preferred method at 235°F.

SPECIAL NEUTRAL-DYEING COLORS———The special acid-color types previously mentioned show better coverage of yarn irregularities than normal acid colors when applied at 212°F. These specific colors possess good neutral affinity and will migrate to a significant degree from neutral dyebaths even at 212°F. The addition of the previously indicated quantities of Duponol D Paste does, however, afford a significant improvement in overcoming barré effects and is recommended for dyeing with these colors.

In dyeing the deeper shades it has been found desirable to use a neutral exhausting agent in addition to the 'Duponol' D Paste dyeing assistant. Magnesium sulfate *(4, 5)* is very effective for this purpose and is recommended for best results. In dyeing light shades with neutral-dyeing colors, exhausting agents are omitted.

Tables III and IV illustrate the dyeing properties of these special neutral-dyeing colors at 212 and 235°F, both in deep and light combination shades in the presence of various dyebath additives. Levelness of the original dyeings obtained under the respective dyeing conditions is indicated by the numerical rating system previously described. The transfer properties under the various conditions are shown by the ratings included in the tables.

From these data, it is concluded that the addition of 2% Duponol D Paste produced more uniform dyeings and insured good transfer even from mildly acid dyebaths. At the higher (235°F) temperature, improved transfer and better uniformity are indicated, but this higher temperature is not necessarily required with these colors if 2% Duponol D Paste is included as a dyeing assistant.

EFFECT ON YARN TENACITY———Samples of nylon yarn, representing Type 100 (bright), Type 200 (semidull) and Type 670 (dull), were tested for yarn degradation by treatment at 250°F for three hours in the presence of Duponol D Paste and also in the presence of a typical alkylarylsulfonate with both acetic acid and formic acid in the treating baths. The results are summarized in Table V.

In general, in the *absence* of dye, appreciable degradation of all three types occurs after three hours at 250°F in the presence of acetic acid or formic acid and the surfactant. However, in the presence of as little as 0.1% dye, degradation

TABLE V

EFFECT OF DUPONOL D PASTE ON YARN TENACITY

Treatments for 3 hrs at 250°F % owf	% Loss in tensile strength					
	with 1.5% dye owf			without dye		
	T-100	T-200	T-670	T-100	T-200	T-670
4.0, acetic acetic, 56%	nil	2.0	nil	nil	4.5	nil
5.0, formic acid, 87%	nil	nil	nil	nil	nil	2.0
4.0, acetic acid, 56% 5.0, Duponol D Paste	3.5	5.8	nil	27	35	32
5.0, formic acid, 87% 5.0, Duponol D Paste	7.5	12.5	8.0	26.7	33.4	—

of the nylon is very substantially reduced. The small amount of degradation noted under these conditions varied with several of the dyes tested but was not of sufficient degree to be of any commercial importance in dyeing processes. Tests at 275°F in the presence of dye, Duponol D Paste, and acetic acid did show *excessive* degradation, and, for this reason, temperatures above 250°F are not recommended.

FASTNESS PROPERTIES——Comparative light-fastness tests with acid colors show generally that no deleterious effect is produced by dyeing at 250°F in the presence of 2% Duponol D Paste and acetic acid in the pH range 4-6. The one observed exception is Pontacyl Scarlet NN, the light-fastness of which is lowered considerably by dyeing at elevated temperatures. However, as previously indicated, this dye does not require high-temperature application methods. In combination shades it is used with other dyes of similarly good levelness by application at 212°F with Duponol D Paste.

Standard wash tests, conducted on mill-dyed samples and on various color combinations dyed in laboratory equipment, have demonstrated that the fastness of the dyes selected is unaffected by the use of Duponol D Paste.

MACHINE DYEING——Particularly in beam-dyeing equipment, antifoam agents are required to eliminate excess foaming in the liquor containing Duponol D Paste. These defoaming agents are added prior to the surfactant. Any of several types of commercial agents may be used, although silicone types appear most effective. In the short volume ratios commonly encountered in practical runs, lesser amounts of Duponol D Paste and acetic acid are indicated. In establishing a range of light-to-dark shades in the laboratory, the following concentrations were indicated:

Volume Ratio	Duponol D Paste, % owf	acetic acid, glacial % owf
40:1	2.0	0.25-2.0
10:1	2.0	0.125 (lt shades)
	1.5	1.0 (medium-dark shades)

After the customary alkaline prescouring procedure and before the setting of the dye liquor, an acetic acid rinse is circulated to condition the fabric batch to a uniform pH. This rinse bath is then dropped.

The dyeing is started at 90°F, and the temperature is increased to 180-190°F in 30 minutes. The ultimate dyeing temperature of 235 to 250°F is attained during an additional 15-minute period. In most instances the batch may be sampled for shade after 30 minutes at the elevated temperatures in the case of medium-depth colors. Most darker shades require 60 minutes to approach equilibrium color exhaustion. Improved uniformity is obtained by maintaining the elevated dyeing temperature for periods of one and one-half hours.

SUMMARY

In this paper a method has been described wherein acid dyes can be applied to filament-nylon fabrics to produce materially improved coverage of nonuniformities that appear as dye defects in ordinary application methods. These more uniformly dyed shades are obtained by dyeing at 235-250°F in the presence of a leveling assistant, Duponol D Paste, which minimizes the unlevel strike of the acid dye and also promotes good transfer at dyeing temperatures of 235-250°F.

With more successful utilization of acid dyes, the dyer is able to obtain a wide range of shades of better wash fastness and brightness than was heretofore possible.

ACKNOWLEDGMENTS

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Western New England Section——

PVP AND ITS APPLICATIONS*

R J HOLMES and D B WITWER

General Aniline & Film Corp
New York, N Y

The authors discuss the versatility and cite current and potential uses for PVP, one of the acetylene compounds GAF is manufacturing by Reppe high-pressure-and-temperature techniques.

The paper is devoted largely to the compound's uses in the textile industry, although its use in pharmaceuticals, cosmetics, beverages, etc, is also covered briefly.

INTRODUCTION

FOR those of you who are unfamiliar with the letters PVP, they stand for Polyvinylpyrrolidone, which is a relatively high-molecular-weight, film-forming polymer manufactured by General Aniline & Film Corporation. It is available in a wide range of molecular weights, usually in the form of a white amorphous powder. PVP is a product of high-pressure acetylene chemistry. It was first prepared in Germany during the 1930's, and since the late 1940's, General Aniline & Film Corporation has continued its development and greatly expanded its scope of uses *(1)*. In the short period of time that it has been available in the United States, many varied uses in a number of diversified fields have been developed. The rapid development of these uses is largely due to a combination of unusual properties possessed by PVP.

For those unfamiliar with PVP, perhaps a summary of the uses which have been developed to date along with a description of the properties of PVP is in order. A number of these uses will be of particular interest to the ladies, as they are directed toward highlighting the natural feminine beauty and, more particularly, toward maintaining the effects of good grooming. You men have not been forgotten by the chemists who develop products to maintain the well-groomed appearance. Another part of this talk will be directed toward the use of PVP in industrial applications with specific emphasis on those applications pertinent to the textile industry. The balance of this presentation will be devoted toward potential applications where advantage may be taken of the unique properties of PVP to obtain special effects or properties incident to PVP and its adducts.

USES FOR PVP

INITIAL USES——Among the first uses for PVP was that of a blood-volume expander. With the outbreak of World War II it became apparent to those nations suffering high civilian and military casualties that they needed a material which could be obtained in volume as a substitute for blood plasma, of which only limited quantities were available. The properties of PVP were found to be very well suited for this use and several millions of pints of PVP solution were administered during the war years in Germany as a replacement for blood plasma. The Germans credit PVP with saving hundreds of thousands of lives during this critical period. The United States Food and Drug Administration has also approved PVP as a blood-volume expander for use in civilian medicine. There is now a substantial stockpile of PVP in solution to meet the demands for blood-volume expanders in the event of a disaster. In connection with its use as a blood-volume expander, PVP has been extensively evaluated and is now widely used as a drug vehicle.

PHARMACEUTICALS——In some cases, PVP is used as a detoxifier, that is, to minimize or eliminate the toxic effects which frequently accompany the administration of many drugs. PVP is also used to prolong the action of drugs and frequently to increase the effective level in the body of the drug being studied. The protective colloidal and film-forming properties of PVP have been used to advantage in many other pharmaceuticals where PVP functions as a suspending agent or as a binder of different types of tablets.

COSMETICS——In the cosmetic field several different applications of PVP have been developed. The most well known of these is the use of PVP as a hair fixative in the very popular and widely advertised "hair nets" or "hair sprays." PVP films will not flake off, and the flexibility and adhesive qualities are utilized in these products to keep the hair firmly, but softly, in place. The fact that PVP is substantive to the hair is probably very important in this case. The water solubility of PVP enables these fixatives to be reset for several days with a wet comb and easily removed by shampooing. The fact that PVP can be easily removed by shampooing is most important, as many of the hair sprays, when first introduced a number of years ago, contained a water-insoluble resin that was most difficult to remove. And oftentimes the hair would become very gummy and sticky when this compound was subjected to shampooing. For quick drying upon application, alcohol solubility is necessary, and PVP is, we believe, unusual in that it is a polymer which is soluble in alcohol as well as water.

PVP is also used in other cosmetics, such as skin creams and lotions, makeup locations, shaving preparations, and deodorants. When using these products you will find that a very thin film of PVP is left on the surface of the skin. This has an emollient effect and offers a degree of lubricity to the skin surface. PVP will also tend to reduce skin irritation which sometimes accompanies a close shave. Many other uses are currently under development and additional products are scheduled to be marketed in the near future.

BEVERAGES——By way of showing the versatility of the product, it should be mentioned that PVP is now of considerable interest as:

1) "Chillproofing agent" in brewing beer *(2)*.
2) Clarifying agent in the manufacture of wines and other beverages.
3) A means of reducing or preventing staining of teeth by coffee and tobacco, when incorporated in dentifrices *(3)*.

These uses all seem to be associated with the "combining" or "complexing" action of PVP.

In the beer and beverage application the

* Presented by R J Holmes before the annual Ladies Night meeting of the Western New England Section on May 13, 1955, at the Waverly Inn, Cheshire, Conn.

ability of PVP to precipitate tannic acid seems to be the most important factor. In the dentifrice application the possible solubilizing action of PVP on tartars has been advanced as an explanation of the mechanism of this interesting application of PVP.

TEXTILES———Many of you no doubt are familiar with Peregal ST, which is the trade name for a solution of PVP marketed by the Antara Chemicals Division of General Aniline & Film Corporation as a dye-stripping aid to decolorize or drastically reduce the color of cellulose fibers that have been dyed with vat, sulfer or direct dyestuffs. Peregal ST is an easily handled, straw-colored liquid with an active ingredient content of 30%. It is stable in hard water and to acids and alkali concentrations normally encountered in the textile trade. When used in combination with reducing agents, it is a most effective dye-stripping aid for cellulose fibers. The effectiveness of PVP in dye-stripping is apparently due to its powerful affinity for dyestuffs as exemplified by vat, sulfer and direct colors. The complex formed between PVP and solubilized dyestuffs is very stable, the stability being of sufficient magnitude to prevent redeposition of the dyestuff on the cellulose fiber from which it has been stripped.

We suggest that, in considering textile applications for PVP, one should give special attention to its use in sizes. Our preliminary work, and that of others, indicates that PVP is an excellent size for several fibers. It appears to be particularly adaptable as a warp size for viscose and acetate and as a "forming" size in the manufacture of glass fibers. This latter use is apparently associated with the outstanding adhesion of PVP to glass surfaces, the toughness and flexibility of the PVP films, and the excellent binding power of the material for the individual glass filaments. As with most sizes, it is necessary to formulate the basic products, in this case PVP. The proper selection of plasticizers to promote flexibility, and the choice of a good lubricant to provide for lubricity between individual filaments and between the formed-thread and metal parts is, of course, very necessary.

In view of the excellent results which have been obtained with PVP, it is suggested that it be tried as a size for many other fibers not specifically mentioned, particularly where special problems exist. In this connection we suggest that PVP also be considered as an additive to present sizing formulations, for example, to promote adhesion of the size to the fiber or as a stabilizer or protective colloid for emulsion-type sizes.

The above-mentioned textile sizes have been considered here as temporary, that is, to be removed before the yarns are processed into finished fabrics. However, in addition to this, we suggest that PVP can also be used to obtain valuable textile finishes. Further, in many instances it should be possible to permit the PVP size to remain on the yarn after processing into a finished fabric so that the PVP functions as both a size and as a finish. For example, in considering the use of PVP on glass fibers, it is suggested that a properly formulated glass fiber size may not require removal prior to the application of finishing agents. The wide compatibility of PVP with many of the materials used as finishing agents, dyes, and inks to produce finished fabrics made of glass, should suggest the possibility that a film deposited on glass fibers from a sizing formulation containing PVP may enhance the dyeability of the glass fabric or improve the printing receptivity of the fabric and, where the glass material is used for producing reinforced plastics, may offer properties which will produce stronger reinforced plastic items. Many products now require a special treatment of the glass fibers before a satisfactory bond between the glass and resin can be obtained. The excellent adhesiveness of PVP to glass has been well established and, further, much information of the compatibility of PVP with many of the resins used in making reinforced plastics has become known. Thus, superior properties, such as improved flexural strength, might be obtained in these reinforced plastics if PVP is used as a treatment for the glass fibers.

Brief mention has been made of the ability of PVP to combine or complex with certain materials. Advantage may be taken of this property to obtain a fabric finish having superior dye receptivity. Of particular interest is work that has been done on the addition of PVP to certain dyestuffs used in the dyeing of acetate fibers. This addition produces a dyed fiber of very uniform shade and color distribution.

It is desirable to deluster many of the synthetic fibers and in many applications titanium dioxide is used as the delustering agent. Many formulators consider T_iO_2 to be unsurpassed for this purpose. Unfortunately T_iO_2 has a tendency to flocculate when thin films are cast from systems in which it is used. Our applications laboratory has obtained results which indicate that small additions of PVP to certain formulations in which titanium dioxide pigments are dispersed have a marked effect in preventing titanium dioxide from flocculating. Studies have shown that in many instances as little as 0.25% of PVP added to the system would prevent this flocculation. Your attention is directed to PVP in those operations which require the use of pigments for reducing the luster of fibers.

Many textile fabrics are used as a backing or as a reinforcing media in producing synthetic leathers or resin-coated materials to be used in upholstery, wall coverings, seat covers, and other applications. Compatibility factors, plus excellent dispersing properties, point to PVP as an additive to organisols, plastisols, laminating adhesives, and other chemical compounds commonly used to produce synthetic leathers and resin-coated fabrics.

Each of us enjoys and appreciates the sight of fresh, bright colors or, more particularly, the whiteness of a freshly laundered white shirt or lace collar or blouse that really looks white. Recent work, which is being vigorously pursued, indicates that PVP may materially aid in obtaining this highly desirable result. For those of you who process synthetic fibers and use graphite as a lubricating agent, two suggestions are presented to aid in the removal of that graphite which is picked up by the synthetic fiber during the processing operation:

1) PVP might be considered as an additive to your size formulation.

2) PVP might be considered as an additive to the detergent formulation which is used to wash the finished fabric so as to remove the deposited graphite particles.

In the first instance the thin film of PVP may prevent the graphite from adhering to the synthetic fiber. In the second consideration, the PVP may aid materially in removing and suspending the graphite. Certain soapers are now conducting extensive tests on the addition of PVP to their home-laundry preparations, and our own research laboratories are continuing their efforts to establish certain fundamentals in the use of PVP in home-laundry preparations.

At this point it would be well to list many of the unusual properties of PVP that make it apparent that this interesting substance will soon find many uses in a variety of fields. Some of these applications will be closely allied to the textile industry.

1) Extremely wide solubility range. PVP is soluble in water as well as most classes of organic solids.

2) Excellent film former. Properly formulated PVP forms strong, flexible, smooth films.

3) Outstanding protective - colloidal properties.

4) Detoxifying action, that is, the ability to reduce the apparent gross toxicity of many substances from oral, parenteral and topical standpoints.

5) Solubilizing property. This is the ability to solubilize, or render easily dispersible in water, many oil-soluble substances.

6) High degree of physiological compatibility.

7) Ability to precipitate polycarboxylic acids

6) Degree of physiological compatibility.

The combination of these properties is unique with PVP, and in our research and the research of others many of these unique properties are being exploited to advantage.

POTENTIAL APPLICATIONS

We have reported in earlier papers on studies demonstrating that PVP is substantive to hair *(4, 5)*. These studies made it inevitable that PVP would be tried with various other fibers, and such studies are now underway. The substantive properties of PVP may be combined with its properties to form addition products with materials such as polyacrylic acids to produce moisture-resistant finishes with good hand, enhanced dyeability, solvent resistant, crease resistant, etc. Also previously reported *(6)* vinylpyrrolidone, the monomer from which PVP is prepared, has been copolymerized with various other monomers, including vinyl chloride, vinyl acetate, vinyl methyl ether, maleic anhydride, acrylics and others.

Some of these copolymers have been processed into fibers which have improved dyeability. The use of vinylpyrrolidone as a comonomer opens up a new field of synthetic fibers, and such studies are being vigorously pursued.

A recent suggestion is the use of PVP to develop new inks based on dyestuffs rather than pigments. Many new colors are potentially possible. In the present ink formulations it is suggested that better gloss and pigment dispersion can be anticipated with additions of PVP or copolymers of PVP to the ink formulations. In a similar way, PVP and copolymers of vinylpyrrolidone and other monomers are being evaluated by paint and varnish manufacturers who are investigating the advantages of these materials as pigment dispersers and levelers or as a carrier for dyestuffs rather than pigments to produce paints or varnishes with better leveling properties, new colors and better pigment dispersion. It is potentially possible to obtain a new type of paint with colors not now possible or very difficult to obtain with pigments, by utilizing the dye-binding properties of PVP and incorporating dyestuffs into the paint rather than pigments.

Other fields in which PVP is receiving extensive evaluation or has been adopted as a raw material include lithography, where it has been reported that PVP is a preferred colloid for use with diazo light sensitizers in making deep-etched plates. We have also obtained information that PVP is an excellent post etch for lithographic plates, where it is used just prior to placing the plate under asphaltum for storage purposes.

The paper industry has also shown a decided interest in PVP. The addition of PVP to formulations used in paper coatings indicates that better pigment dispersions will be obtained with a smoother, more uniform and level surface coating. Potentially high-gloss machine finishes are also indicated. Other suggested uses in the paper field are modest additions of PVP to sizing formulations to obtain sheets of improved wet strength and ink receptivity. Suggestions have been made that the complexing property of PVP with certain polycarboxilic-acid compounds may be used to advantage in producing paper products with superior wet-strength properties and for other special effects. It is known, for example, that the adduct of PVP and PVM/MA is an insoluble precipitate, highly resistant to solvation in water, alcohol, and other organic solvents.

It has also been demonstrated that the adduct, when formed in an ammoniacal or alkaline solution, will not precipitate. Excellent films are obtained from the standpoint of clarity and scuff resistance when such films are cast from the ammoniacal or alkaline solutions of PVP and PVM/MA.

In the adhesive field, it has been suggested that PVP, due to its adhesiveness to a variety of surfaces in addition to its compatibility with many of the ingredients used in adhesive formulations, offers potentially unique and useful new adhesive formulations. It has been determined that extremely stable dispersions of vinyl adhesives are obtained when PVP is used, either during the polymerization of the vinyl monomer, or as an additive to the vinyl polymer after polymerization has taken place. Recent work has shown that many of these vinyl-type adhesives have a superior adhesiveness to a number of surfaces and, in addition, adhesive films cast from the recipes to which PVP has been added show a marked degree of leveling.

Wax and polish formulations containing PVP, or its copolymers, have shown improved luster. This may be due to the improved cleaning of the surface obtained by adding PVP to these wax or polish formulations and to the film characteristics inherent to PVP.

CONCLUSION

There is no question that many new and unique uses for PVP in the textile field and in other industries will be found. These new uses may be in the field of new fibers, new finishes, new sizings, new coatings, new dyeing methods, new inks, etc. Thus, it is apparent that much work remains to be done. As the sole producer of polyvinylpyrrolidone polymer and vinylpyrrolidone monomer in the United States, General Aniline & Film Corporation wishes to do all it can to aid in these developments and to offer services wherever it may be helpful. At the present time, we are in a semiworks production and next year we will produce PVP in our new large commercial plant now under construction in Calvert City, Kentucky. It has been gratifying to find an ever-expanding horizon for this unusual and versatile polymer. We hope it will solve some of your application problems.

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Prices postpaid: 50 cents each to nonmembers of AATCC, 35 cents to members; complete volumes $5.25 to nonmembers, $4.50 to members.

News of the Trade

• New Latex-Compounding Plant in Gastonia

A new latex-compounding plant designed to speed service to the Southern textile industry, and other Southern users of latex compounds, has just been put into operation at Gastonia, N C, by the Naugatuck Chemical Division, United States Rubber Co.

The plant reportedly will be capable of mixing any natural and synthetic rubber latex formulations used in nearby plants of the textile, carpet and paper industries.

Claude H Allard, who has been a technical representative for Naugatuck Chemical in the South for the past five years, has been named branch manager at the new plant. He will manage the plant and also be sales manager of the Gastonia district. Mr Allard joined Naugatuck Chemical in 1947 and spent three years at its plant in Naugatuck, Conn, in development and technical service before his assignment as technical representative in the South.

The new plant is a streamlined operation, using high-speed mixing equipment. The latex flows through pipe lines from storage tanks to the compounding equipment, then directly into railroad tank cars or tank trucks. Or the compound is piped into drums that are shipped by trailer truck.

The plant was constructed on eight acres of land owned by US Rubber, which also has a textile plant in Gastonia. It has 30,000 square feet of manufacturing and storage space.

• Du Pont Announces New Zeset Quality-Control Program

A new quality-control program for fabrics treated with Du Pont's Zeset fabric stabilizer was announced by the company early this month.

Designed to promote Zeset as a symbol of quality in crease-resistant finishes, the new program will limit the use of the Zeset tag to only those fabrics which have been tested and approved by the Better Fabrics Testing Bureau.

Fabric samples will be tested for crease resistance, shrinkage control, tensile or tear strength, and color fastness to washing. After tests are completed, BFTB will authorize issuance of the new Zeset tag to fabrics which have received their approval.

• Columbia Given Grant-in-Aid by Heyden Chemical

Columbia University has been given a grant-in-aid by Heyden Chemical Corporation for organic chemical research under the direction of Cheves Walling, professor of chemistry.

The studies will be concerned with the effect of structure on reactivity in aromatic halogenation, and will be carried out by Burton B Jacknow, candidate for the PhD degree in chemistry.

• CCDA-CMRA Joint Meeting Set

The Commercial Chemical Development Association and the Chemical Market Research Association are holding a joint meeting November 14-15 on the subject "The Chemical Fibers — Problems and Predictions."

The meeting is to be held in the Carter Hotel, Cleveland, Ohio.

OBITUARY

CHARLES P GULICK, honorary chairman of the board of Nopco Chemical Co, died September 4th at Dover (N J) General Hospital after a brief illness. He was in his 70th year.

One of the founders of Nopco, Mr Gulick served as president of the Company from 1932 to 1938, chairman of the board from 1938 to 1940, and served in both posts from 1940 to 1949. He was chairman of the board from 1949 to 1954, after which he held the position of honorary chairman of the board.

When he helped found the Company in 1907, Nopco's assets consisted of a few wooden vats, a couple of paddles, and a few hundred dollars in cash. Operating out of a rented basement in Newark, N J, its "line" consisted of a single product. Today Nopco is a leading manufacturer of synthetic organic chemicals for industry with thousands of products, and with several plants in the U S and Canada.

Surviving are his wife, Florence E, and three sons, Richard N, John N, and George N.

• Nopco Plans Construction of New Pilot Plant

Plans are being made by the Nopco Chemical Company for the construction of a new pilot plant on its property in Harrison, N J. The new structure will be devoted exclusively to developmental work and pilot production of new and improved products.

The site selected is approximately 10,000 square feet, and is located on the Passaic River front. Although definite plans have not yet been drawn up, a multistory building is envisaged.

Nopco officials hope to have the building ready for occupancy early in 1956.

• PHS Courses

Representatives from industries co-operating with official agencies in environmental health programs, such as water-pollution control, are eligible for enrollment in a series of courses being offered this fall by the Public Health Service, Department of Health, Education, and Welfare.

All courses will be held at the Robert A Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio.

The agenda of courses follows:

Oct 24-28 — Advanced Training in Detection and Control of Interference Organisms (in water supplies)

Nov 8 — Individual Household Sewage Disposal Systems

Nov 28-Dec 9 — Advanced Training for Sanitary Chemists in Water-Pollution Investigations

Dec 5-9 — Problems of Radioactivity in Waterworks.

More complete information may be obtained by writing to the Robert A Taft Sanitary Engineering Center.

• 73rd PTI Fall Opening

The Philadelphia Textile Institute will have its seventy-third fall opening on October 3rd for freshmen, and October 5th for upperclassmen. The incoming freshmen class will total 105 students from the United States and ten foreign countries, according to Donald B Partridge, dean of students.

The new $600,000.00 Residence Hall, which will supply living accommodations on the campus of the college for the first time in its history, will be available to students sometime this fall.

• NEW PRODUCTS AND DEVELOPMENTS •

• New Process Said to Increase 4X Wearing Qualities of Rayon

A thin coating of synthetic rubber latex, it is claimed, increases the wearing qualities of rayon cloth more than four times without dulling the cloth's bright colors in a new process developed by Poughkeepsie Finishing Corp, Paterson, N J, in conjunction with Midland Textiles, Inc, New York, N Y.

The special synthetic resin latex is made and compounded by the Naugatuck Chemical Division, United States Rubber Co. The latex is applied to the reverse side of the cloth. It is said to be a permanent coating, not affected by chemicals used in the finishing operation or by cleaning fluids.

The individual fibers in the cloth are locked together by the coating, which reportedly steps up the cloth's abrasion resistance four to five times. It also is said to increase seam strength, important in sewing, while preventing ravelling and fabric slippage at the cloth edges. It is also claimed that the stiffness (hand) of the fabric is increased, thereby permitting thin fabric to be used for heavier jobs.

The coating is not air-tight. The cloth is said to retain its porosity, permitting its use in upholstery work. The coating reportedly does not produce odor in the cloth.

Smooth-surfaced fabrics in plaids, dobbies, stripes and solids, woven from multifilament rayon by Midland Textiles, are now being coated wtih the new process. It is reported that in no case has the lustrous color in the cloth been diminished by the coating.

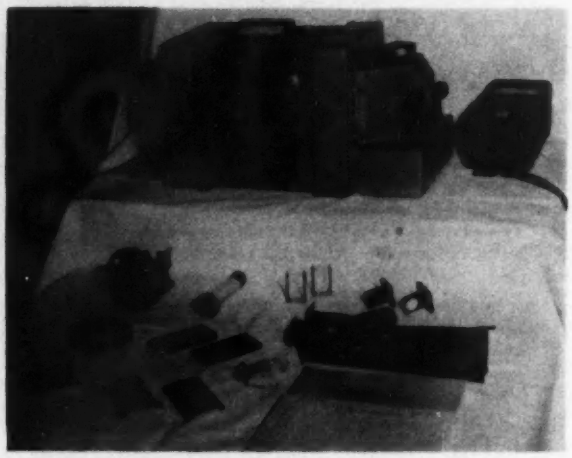
The coated cloth is now being used in automobile seat covers. It is also being tested in furniture covering.

• Polycoupler

Polycoupler, a textile chemical formulation to be added to textile resin solutions, is currently being offered by its manufacturer, Textile Adjuncts Corp, 876 Pacific St, Brooklyn, N Y, as an aid in assuring odor-free resin finishes at the end of the cure box.

The product is not a catalyst, but is designed to accelerate polymerization and to bind the resin molecules during the cure process. It is said to sharply reduce generation and liberation of formaldehyde and the available NH_2 groups on resinated fabrics, thereby resulting in a nearly odorless cured cloth.

Polycoupler reportedly will not stain or affect dyeability, hand, or embossing levels of special finishes.



Model C Color-Eye with abridged spectrophotometer attachment

• New Abridged Spectrophotometer Attachment for Color-Eye

Instrument Development Laboratories, Inc, 163 Highland Ave, Needham Heights 94, Mass, reports that measurement, standardization and control of dyestuffs and finished product colors are "practical, easy, reliable, and accurate" with their Model C Color-Eye and its new abridged spectrophotometer attachment.

The attachment reportedly makes available ten narrow-band interference filters at approximately equally spaced wavelengths through the visible spectrum to allow measurements being made under identical conditions of illumination and viewing. Each filter element is bonded to an interference cell to eliminate secondary peaks. Filter peaks occur within ±2 millimicrons of the following nominal wavelengths: 400, 433, 467, 500, 533, 567, 600, 633, 667, and 700.

Optical cells are available to make transmission and reflectance measurements of transparent liquids. Relative accuracies of 0.1% are reported to be possible by comparison tests, and it is claimed that a complete set of readings over the spectrophotometric range can be made in two minutes. No balancing or zero adjustments are required.

• Nuvel

Zimmerman Associates, chemists and engineers, Guilford College, N C, has introduced Nuvel, a new softener for the general textile, laundry and household trades.

It is claimed that this neutral, amphoteric-type softener may be used direct in the scouring, dyeing or finishing operations, imparting a soft, full, durable hand. The product is said to be completely stable to acid, alkali, and high temperatures without yellowing; and it reportedly may be used in conjunction with optical bleaches.

• Polyco 296-W

A new polyacrylate thickener for use with resin emulsions has been developed by the Polyco Department, The Borden Company's Chemical Division, Peabody, Mass. It is now available in commercial quantities.

Called Polyco 296-W, the new product is said to have an exceptional thickening effect on natural latex, Buna N rubbers, butadiene styrene, GRS latex and most polyvinyl acetate and other synthetic resin emulsions. It is said to introduce no undesirable odor or color into compounded products and cause no syneresis and coagulation. There reportedly is no separation, and approximately neutral pH is said to permit use with sensitive emulsions. Viscosities are claimed to be unusually stable over long periods of time.

Principal use of Polyco 296-W is as a thickener, protective colloid and stabilizer for natural and synthetic resin emulsions. Additional uses include textile sizing.

• X-Tan-Assist

X-Tan-Assist, a bleaching and stripping additive said to inhibit corrosion and odor caused by sodium chlorite and to increase its bleaching effectiveness by as

(Concluded on Page 708)

NAMES IN THE NEWS

Larson

Chamness

CLARENCE E LARSON has been appointed vice president in charge of research for National Carbon Company, a Division of Union Carbide and Carbon Corporation.

Dr Larson was formerly director of the Oak Ridge National Laboratory, operated by Union Carbide for the Atomic Energy Commission. His headquarters will be in Cleveland, Ohio, at the Company's new research laboratory now under construction in a Cleveland suburb.

L M CURRIE, formerly vice president in charge of research, will continue as vice president and will assume new responsibilities involving assistance for sales, production, development, and research.

DONALD C O'HAIR has been added to the sales staff of Mona Southern, a Division of Mona Industries, Inc.

Mr O'Hair will take care of the North Carolina-Virginia territory.

JAMES H CHAMNESS has joined the Research Laboratory of Bryant Chemical Corp, North Quincy, Mass. Mr Chamness formerly was with Eastman Kodak Company.

Recent scholarship winners at the School of Textiles, North Carolina State College, include ERNEST KOHN SHERRILL and WILLIAM HENRY GRAY.

Mr Sherrill has been awarded the $400 American Enka Corporation scholarship, and Mr Gray is the winner of the $500 American Viscose Corporation Award.

JAMES A PARKER, assistant professor of textiles in the School of Textiles at North Carolina State College, has left for Lima, Peru, where he will serve for three months as technical consultant on the School of Textiles' "Textile Engineering Project" in that South American country.

GEORGE C HOWARD, former foreign service officer of the U S State Department, has been appointed resident representative of the project in Lima.

During the past six months, five members of the staff of the School of Textiles have gone to Peru to participate in the program, including MALCOLM E CAMPBELL, dean; E B GROVER, head of the Dept of Yarn Technology; HENRY A RUTHERFORD, head of the Dept of Textile Chemistry; CLARENCE N ASBILL, JR, head of the Div of Textile Machine Design and Development; and JOSEPH A PORTER, Dept of Fabric Development.

R W EDDY and J J MORRIS have been appointed assistant managers of the Fine Chemicals Division of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. They will report to W A WOODCOCK, manager of Fine Chemicals.

Mr Eddy has been product manager directing market development of chemical intermediates including acrolein and its derivatives and new chemicals from the Company's new Oxo unit. Mr Morris has been product manager directing market development of Flexol plasticizers and stabilizers for vinyl resins.

GENERAL CALENDAR OF COMING EVENTS

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS
National Convention—Sept 26-28, Lake Placid, N Y.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Mid-Atlantic Textile Conference—Nov 3-4, N C State College, Raleigh, N C.

COMMERCIAL CHEMICAL DEVELOPMENT ASSOCIATION & CHEMICAL MARKET RESEARCH ASSOCIATION
Joint Meeting—Nov 14-15, Carter Hotel, Cleveland, O.

THE FIBER SOCIETY
Spring Meeting—May 2-3, The Clemson House, Clemson, S C.

NATIONAL COTTON COUNCIL OF AMERICA
7th Annual Cotton Research Clinic—Feb 15-17, Pinehurst, N C.

NATIONAL COUNCIL FOR TEXTILE EDUCATION
October 17-19, The Larches, Hopedale, Mass.

THE NATIONAL FEDERATION OF TEXTILES, INC
Annual Meeting—Oct 4.

NATIONAL SAFETY CONGRESS AND EXPOSITION
Industrial Safety Sessions—Oct 17-21, Conrad Hilton, Morrison and La Salle Hotels.

NORTHERN TEXTILE ASSOCIATION NATIONAL ASSOCIATION OF COTTON MANUFACTURERS
Annual Convention—Sept 29-30, Wentworth-by-the-Sea, Portsmouth, N H.

PERKINS CENTENNIAL
September 10-15, Waldorf-Astoria Hotel, New York, N Y.

PHI PSI FRATERNITY
Annual Meeting—April 19-21, Alabama Polytechnic Institute, Auburn, Ala.

THE QUARTERMASTER ASSOCIATION
Annual Convention—Oct 27-28, Conrad Hilton Hotel, Chicago, Ill.

SOCIETY OF RHEOLOGY
1955 Meeting—Nov 2-4, Henry Hudson Hotel, New York, N Y.

SOUTHERN TEXTILE EXPOSITION
19th Exposition, Oct 1-5, 1956, Textile Hall, Greenville, S C.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION
Oct 11, Nov 9 (Hotel Commodore, New York, N Y).

TEXTILE METHODS AND STANDARDS ASSOCIATION
Fall Meeting—Sept 29-30, Clemson House, Clemson, S C.

TEXTILE RESEARCH INSTITUTE
1956 Annual Meeting—March 22-23, Hotel Commodore, New York, N Y.

TEXTILE TECHNICAL FEDERATION OF CANADA
5th Bi-annual Textile Seminar—June 5-7, Queen's Univ, Kingston, Ont.

TECHNICAL LITERATURE

ACRYLIC ESTERS——*Carbide and Carbon Chemicals Co, 30 E 42nd St, New York 17, N Y*——Ethyl acrylate, n-butyl acrylate, 2-ethylbutyl acrylate and 2-ethylhexyl acrylate are described in technical bulletin F-7454.

The new booklet covers methods of polymerization, applications of polymers and copolymers, and selected references. Physical and chemical properties, shipping data, and reactions of the acrylic esters in chemical syntheses are included.

BRISTOL STRIP-CHART RECORDERS——*The Bristol Co, Waterbury, Conn*——This new bulletin describes Bristol's line of 6-inch strip-chart recorders for pressure, liquid level, temperature, flow, and mechanical motion.

The 12-page, two-color bulletin contains installation drawings showing methods of applying the instruments to the different variables, as well as photographs of the various models and their features. The use of the recorder as a receiver for remotely generated signals, either pneumatic or electrical, is also described.

BRISTOL PRICE LIST ON pH EQUIPMENT——*The Bristol Co, Waterbury, Conn*——This 16-page price list and specification bulletin (Q1305) covers Bristol pH recorders and controllers for use with Beckman electrodes and amplifiers. Specifications are written to enable a user to select the pH indicating, recording, or automatically controlling equipment best suited to his particular needs.

Included are Electronic Dynamaster Potentiometers in electric, pneumatic and program control models, as well as Bristol-Bock control systems. Indicating millivoltmeter electric controllers are also offered. Nonrecontrolling models include round and strip-chart recorders with one and two continuous records, and strip-chart multiple printing models, as well as indicating millivoltmeters.

Featured in the bulletin is Bristol's new fully portable pH recorder for stream pollution studies or for laboratory use where a permanent installation is not justified.

FRANKLIN PROCESS COLOR NEWS LETTER NO. 2——*Franklin Process Co, 564 Eddy St, Providence, R I*——This brochure shows eight new fashion colors anticipated for the summer of 1956.

Trends in color indicate considerable popularity for straw beige, goldenrod yellow, olive khaki, kumquat orange, sari red, saddle brown, pine green and caribbean blue. The Franklin Process News Letter contains actual colored yarn samples and includes pertinent descriptive comments.

INDUSTRIAL WASTE TREATMENT — CONTROL OF pH AND REDOX POTENTIALS——*Leeds & Northrup Co, 4934 Stenton Ave, Philadelphia 44, Pa*——Process data sheet 700(2) outlines latest L&N developments for control of pH and redox in industrial waste treatment processes.

The sheet includes a discussion of "controllability factors" in waste processes that are reported to influence automatic measurement and control of pH. With it is provided a "pH Controllability Analysis Questionnaire." This may be completed and returned for L&N recommendations of control methods and equipment.

MOTORIZATION——*ACEC Electric Corp, 40 East 49th St, New York 17, N Y*——Electrification of a five-bowl wool-scouring machine has eliminated a maze of shafts and belting and their attendant maintenance problems, according to an illustrated article beginning on page 10 of the first issue of *Motorization*, a new publication devoted to progress in the use of electric motor unit drives by industry.

Operations in each bowl of the machine include dipping and gently agitating the wool hanks in the scouring bath, squeezing out excess liquids, and lifting and lowering the wool into the next bowl, where a similar cycle is repeated. The article cites how the drive for each bowl's mechanism formerly required five countershafts and a complex array of belts and pulleys with heavy supporting framework. It is pointed out that, when this complex arrangement was replaced by ACEC-SADI electric gearmotor for each bowl, the area above and around the machine was cleared of whirring shafts and slapping belts and maintenance reduced to a minimum.

ACEC-SADI gearmotors selected for this machine each deliver 3½ hp at 51 rpm, with a maximum torque of 8670 lb/in and are close-coupled to the drive shaft with rubber v-belts. The article also describes other methods of electrification where space is limited to a greater degree.

MULTIPLE-ROLL CALENDARS——*Textile Machinery Div, McKiernan-Terry Corp, 80 Richards Ave, Dover, N J*——Bulletin T-103 illustrates and lists the distinctive features of McKiernan-Terry open-side-frame pneumatically loaded calendars, which are built with 3, 4 and 5 rolls in sizes from 15 to 60 tons. The adaptation of the machines to rolling, friction, Schreiner and embossing services is graphically shown by sketches, and the illustrations show the arrangement of the calendars for various number of rolls.

ODOR-PROOFING RESIN SOLUTIONS——*Textile Adjuncts Corp, 876 Pacific St, Brooklyn 38, N Y*——This technical data bulletin, PC-1-102, covers the methods of using Poly-Coupler, a textile resin co-polymer, for the prevention of amine odors and to reduce the incidence of free formaldehyde. Methods are also given for the reclaiming of resinated fabric after "fish" odors have developed.

THERMOCOUPLE CONNECTORS——*Minneapolis-Honeywell Regulator Co, Industrial Div, Wayne and Windrim Aves, Philadelphia 44, Pa (W A Lang, product editor)*——Specification Sheet 56 describes Army-Navy (AN) Thermocouple Connectors. These are said to provide a quick and easily detachable connection for one or more thermocouple circuits. They consist of mating plug and receptable assemblies, keyed to prevent incorrect assemblies. Their particular usefulness is said to be in test assemblies and for panelboards which are set up for semipermanent use.

X-TAN-ASSIST——*The Tanatex Corp, Belleville Turnpike, Kearny, N J*——This technical bulletin discusses an economical bleaching and stripping additive which is said to inhibit corrosion and odor caused by sodium chlorite and increase its effectiveness up to 50%.

New Products —

(Concluded from Page 706)

much as 50%, has been introduced by The Tanatex Corporation, Belleville Turnpike, Kearny, N J.

By controlling the formation of chlorine dioxide gas to the rate at which it is used up in bleaching, X-Tan-Assist is claimed to inhibit undesirable effects from excess gas and at the same time to reduce consumption of sodium chlorite by 1/3. X-Tan-Assist is also reported to lessen surface tension of the bleaching bath, resulting in a more uniform bleaching action, and to stabilize any pH on the acid side.

A technical bulletin containing specific formulations for the use of X-Tan-Assist in stripping and in bleaching cotton, cotton-rayon blends, viscose, acetate, acetate-viscose blends, Dacron, nylon, and Orlon is available on request from The Tanatex Corporation.

• New Aquex Products

Aquex Development & Sales Corp, Whippany, N J, has announced several new developments in its line of products for the textile and paper industries.

Polyethylene emulsions have been prepared in cationic, anionic and nonionic systems. Among them is an anionic emulsion that is said to develop excellent water resistance on both textiles and paper without special aftertreatment.

Aquex reports that, although interest in its Polypel F, a dispersible solid polyethylene complex, is "very gratifying," efforts to improve the working properties of the material continue.

Under development at the present time are new thermosetting resins, polyvinyl chloride resin emulsions, plasticizers and softeners.

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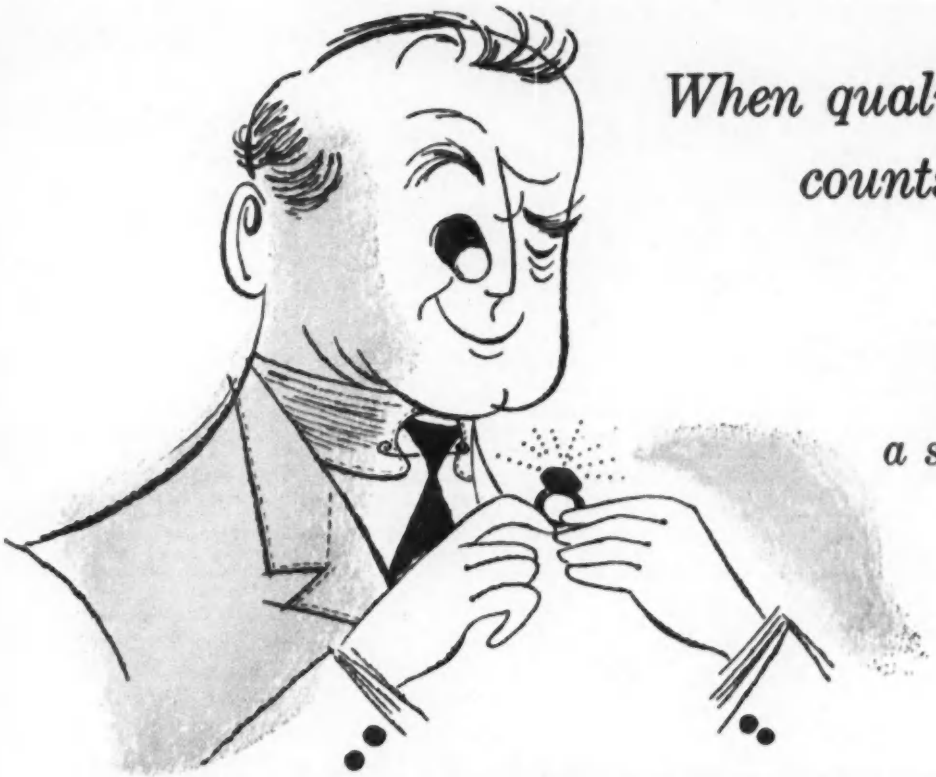

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CLASSIFIED ADVERTISEMENTS

Advertisements in this section are restricted to HELP WANTED—POSITIONS WANTED—EQUIPMENT wanted or for sale. Rates, effective February 1, 1951: One-time, $10.00 per column inch; 3 consecutive times (same copy), $9.00 per column inch; 13 or more times, $8.00 per column inch; Position Wanted, $2.00 per column inch. Figure 38 average words per column inch. Publisher reserves the right to reject or discontinue any classified advertisement. Replies should be addressed: Box Number . . . c/o American Dyestuff Reporter, 44 East 23rd Street, New York 10, N. Y.

ABSTRACTING SERVICE—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuff and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

POSITION WANTED: Textile chemist, age 31, experienced dyeing and finishing plant and development of textile chemicals. Desires opportunity in sales work. Write Box No. 973.

WANTED: Dyer chemist with 2 to 5 years experience in dyeing woolens and woolen blends. Laboratory development work, with possibility of some travel later. Southeastern location. Salary open, depending on qualifications. Write Box No. 975.

WANTED: DYER—For raw stock-wool, rayon and newer synthetic fibers. Dye house near Raleigh, N. C. Good salary and promising future for man of proven ability. State full particulars. Apply to—B-33, P.O. Box 3575, Philadelphia 22, Pa.

WANTED: DYE HOUSE LABORATORY TECHNICIAN—Excellent opportunity for young man to learn dyeing, raw stock-wool, rayon, and newer synthetic fibers. Furnish complete resume in first letter. Reply to—C-34, P.O. Box 3414, Philadelphia 22, Pa.

WANTED: OPPORTUNITY DESIRED for utilizing the knowledge and proven experience of 24 years in bleaching, dyeing, and mechanical and chemical shrinkage control elements of the textile industry. At the age of 41 offer a background of both production and executive accomplishments. Experience on natural and synthetic tubular textiles. Possess basic knowledge of the industry as a whole. Write Box No. 965.

POSITION WANTED: If you require an aggressive person with imagination and know-how for Technical Service Development, or Technical Sales in any branch of textile industry, please contact this individual. Ten years' experience as laboratory supervisor, dyer, finisher, management. Textile college graduate. Write Box 980.

SALESMAN WANTED: To sell textile chemical specialties such as wetting agents, detergents, softeners, finishers, etc. to textile mills in the New York-New Jersey area and in the Southern area. Must be experienced in selling these products. Give full particulars. Replies held confidential. Write Box No. 981.

POSITION WANTED: Textile Chemist, (M.S.) desires opportunity for advancement with progressive company. Five years' experience in laboratory and mill in dyeing and finishing of synthetics, including latest acrylics. Interested in technical service, product development, or demonstrating. Write Box No. 982.

POSITION WANTED: TEXTILE CHEMIST AND COLORIST. Director of dyestuff application laboratory. Expert in standardizing, color matching and testing of all classes of dyes on all fibres, dyeing and printing. Considerable experience in technical sales and administration. Seeks responsible position. Will consider sales. Write Box No. 983.

WANTED: Shift dyer wanted in North Carolina. Must have experience in pad-steam units with vats, naphthols, and sulphurs. Reply stating experience, age, previous employment, and salary expected. All replies confidential. Write Box No. 986.

● Classified Advertisements ●

POSITION WANTED: Laboratory Technician and Colorist, with mill experience, technical background. Interested in a position which will enable fuller use of capabilities. Veteran, married, responsible. New York or New Jersey preferred. Write Box No. 984.

POSITION WANTED: Young man with diversified laboratory and mill experience desires position as Textile Colorist in laboratory or Mill Dyer. Experienced on wool, rayon, cotton, orlon, acrilon and newer synthetics in piece and yarn form. Expert color matcher, troubleshooter. Capable of handling responsibilities. Write Box No. 985.

DRY COLOR SALESMAN wanted by manufacturer of fine Organic Dry Colors located in New Jersey. Must have well established contacts with color consuming trades such as plastics, paper coatings, textile inks, carbon paper, crayons, etc. Excellent opening for the right man. Send resume with details of education, experience, etc. Write Box No. 988.

WANTED: LABORATORY TECHNICIAN-COLORIST: Cotton package dyehouse in North Carolina. Give details of background and salary desired. Write Box No. 989.

CHEMICAL SALES ENGINEER wanted by American firm in Japan representing prominent U.S.A. manufacturers of all types industrial chemicals including dyestuffs. Must be experienced and qualified to sell to customers and direct native sales force. Write giving references, resume of education, experience, salary expected. Write Box No. 990.

POSITION WANTED: 30 years' experience as head dyer and plant manager on piece goods, dyeing on vats, sulphur, diazo and direct dyeing. Desires position as plant manager or practical expert by dyeing or chemical house. At present employed. Write Box No. 991.

WANTED: TEXTILE CHEMIST. Opportunity for young man with technical background to do research and development work on special finishes as applicable to cotton and synthetic fabrics. Permanent position with progressive textile company located in Virginia. Write Box No. 992.

INDEPENDENT COMMERCIAL LABORATORY has unusual opening for competent chemist experienced in wool technology. Thorough knowledge of wool preparation and a familiarity with quality control techniques essential. Plans for expansion of laboratory offer exceptional opportunity to persons possessing resourcefulness and executive ability. Salary open. Our staff knows of this advertisement. Write Box No. 987.

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SEYCOPEN M, is blended of quality-controlled cresol and additives, gives rapid uniform wetting of mercerizing caustic without foaming, settling, separating; trouble-free!

SEYCOPEN 1712 has all the rapid-wetting, uniform-absorbing properties of cresylic-type agents, and is harmless to the skin. Has pale straw color, pleasant odor.

SEYCOPEN 1728 is effective over a wider range of caustic concentrations.

None of these mercerizing agents will cause any difficulties in caustic recovery systems. Our non-cresylic agents even retain most of their wetting power!

For more information, write, wire or call, giving your specifications.

Headquarters for Textile Chemicals

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Prompt shipment

Correctly designed and built on 30 years' meeting textile requirements. Fully corrosion-resistant, re-inforced construction, expert workmanship; types and sizes for every need. Also beakers, stock pots, batch cans, shovels. Buy your next utensils from "Metalsmiths" and compare the value.

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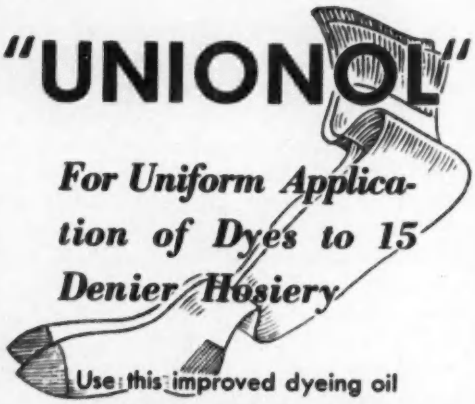

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Use this improved dyeing oil to assure level dyeing—good unions—and to guard against costly rejects and redyeing.

Leatex *"Always Reliable"*

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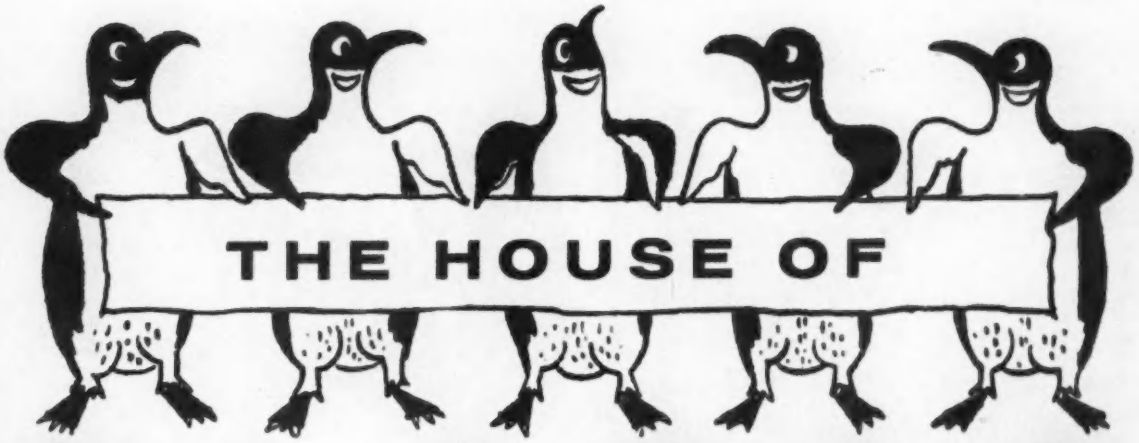

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Excellent Level Dyeing Properties
Very Good Fastness to Light

Recommended for producing fast shades on Ladies' Dress Goods, Carpet Yarn and Upholstery Materials.

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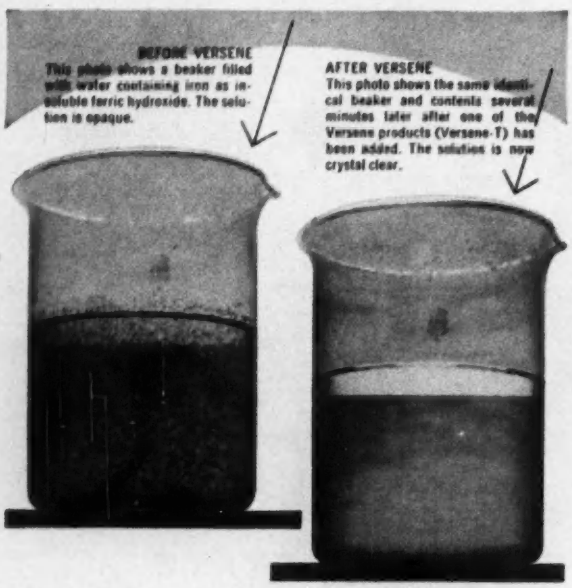
BEFORE VERSENE
This photo shows a beaker filled with water containing iron as insoluble ferric hydroxide. The solution is opaque.
AFTER VERSENE
This photo shows the same identical beaker and contents several minutes later after one of the Versene products (Versene-T) has been added. The solution is now crystal clear.

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Versene is your key to chelation. When faced with a problem in metal ion control call on the Versene best designed to help you. There's an efficient Versene for every chelation job — regardless of pH. Outline your situation. Ask for confidential chemical counsel, technical data and the *right* sample.

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Independent Chemical Corp., One Hanson Place, Brooklyn 17, N. Y.
Borada & Page, Inc., Houston, Dallas, Corpus Christi, Odessa, New Orleans, St. Louis, Wichita, Oklahoma City, Tulsa, Kansas City, Mo.
George Mann & Co., Inc., 251 Pee Point Blvd., Providence, R. I.
Braun-Knecht-Heimann Co., San Francisco, Calif., Salt Lake City, Utah
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NO PREMIUM PRICE for the purest EDTA

Glyco's ethylenediamine tetraacetic acid (EDTA) gives you more for your money. This versatile sequestering agent contains 99+% active ingredient, and is the purest form available commercially. No inert salts are present. The highest possible concentration of material goes to work in your operation, with no additional cost for purity.

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scouring	**bleaching**
dyeing	**stripping**
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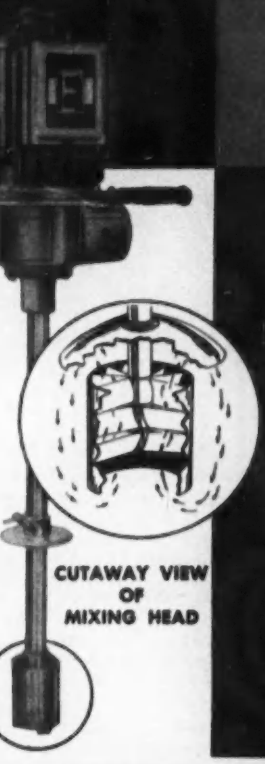

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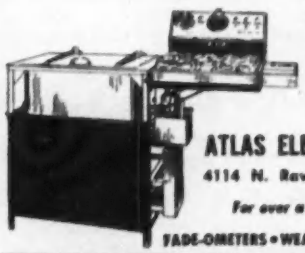

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